FLIGHT

MAGAZINE

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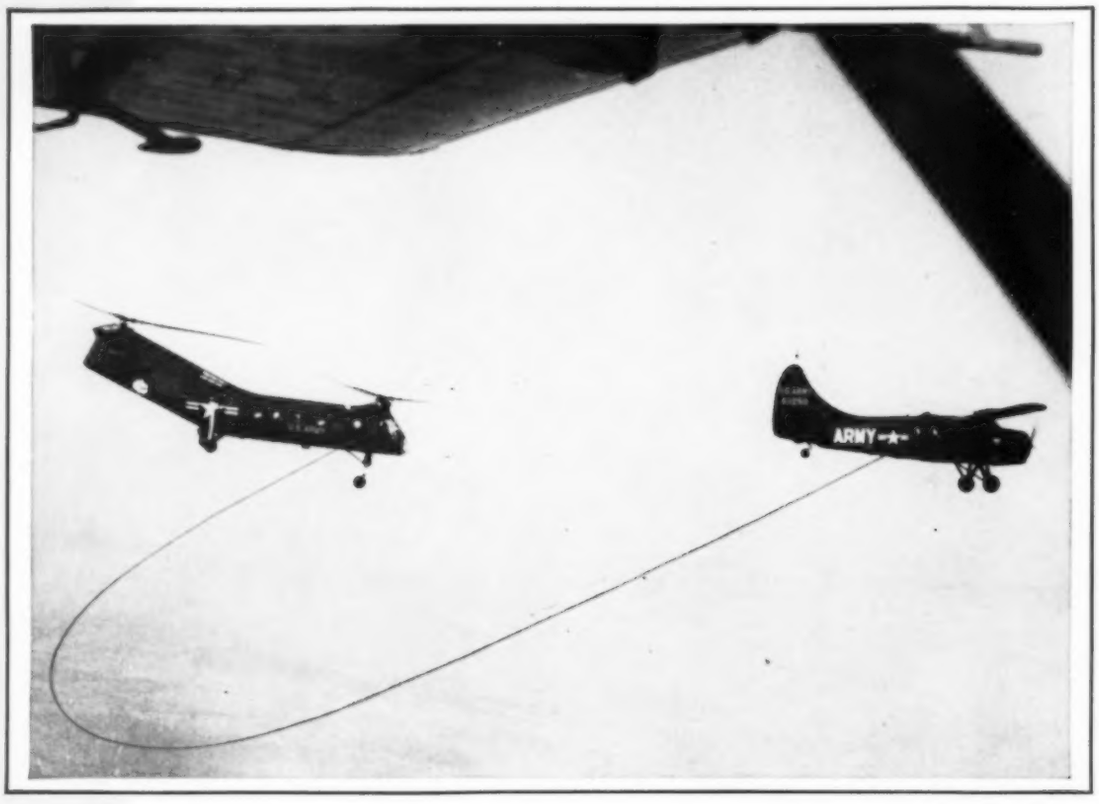
(See page 24)

Team Mates



The maximum range of the Vertol H-21C light cargo helicopter is approximately 300 miles. Yet, on August 25th, 1956 an H-21C touched down at the Pentagon heliport. Washington, D.C. to complete a nearly 2700 mile non-stop flight from San Diego, California.

Army aviation officers were quick to say that the 32-hour flight proved the practicability of ferrying helicopters as much as 3000 miles to increase the striking power and mobility of ground forces.

A major assist was given to the Army's whirlybird on its transcontinental flight by a U.S. Army U-1A Otter aircraft. The Otter, converted into a flying fuel tank, refueled the H-21C in flight over Wink, Tex.; between Big Springs and Abilene, Tex.; at Maxwell AFB, Ala.; and at Fort Benning, Ga.

For the Canadian designed and built Otter, the job of wet nursing a cross-continental helicopter was just another routine chore. Many hundreds of Otters and Beavers function as prime utility support for the U.S. Army.

After refueling the helicopter, it was necessary for the Otter to land and take on fuel, and then, after dropping far behind, set out to overtake the helicopter on its non-stop trans-continental flight. Great credit is due to Captain Leonard F. Seitz, Captain James H. Stebbins, SFC Joseph Loncar and SP/3 Charles H. Glass, the crew of the U1-A tanker who carried on with little food and no rest for 30 hours continuously, as well as to the gallant crew of the H-21C.

The Otter was a logical choice to provide in-flight refueling of the H-21C. Its exceptional control qualities at slow flying speed and the high position of the tail plane combine to facilitate efficient co-ordination of the refueling maneuver. Additionally, the generous cabin space facilitates the cargoing of a maximum fuel payload.

THE Otter

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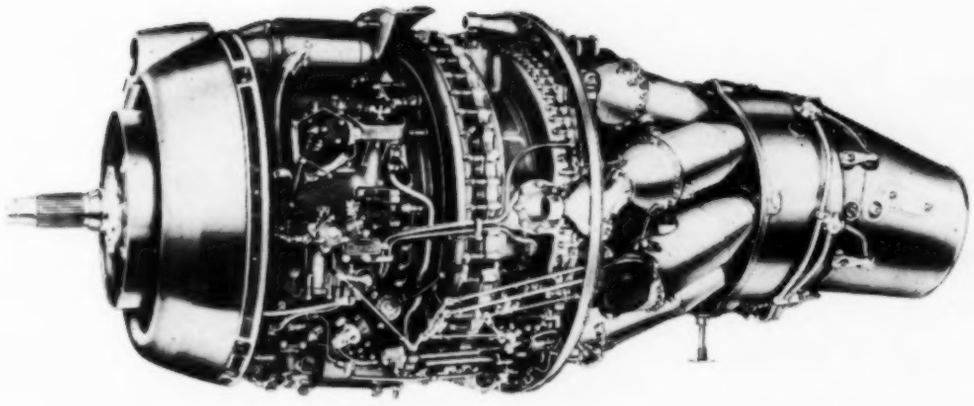

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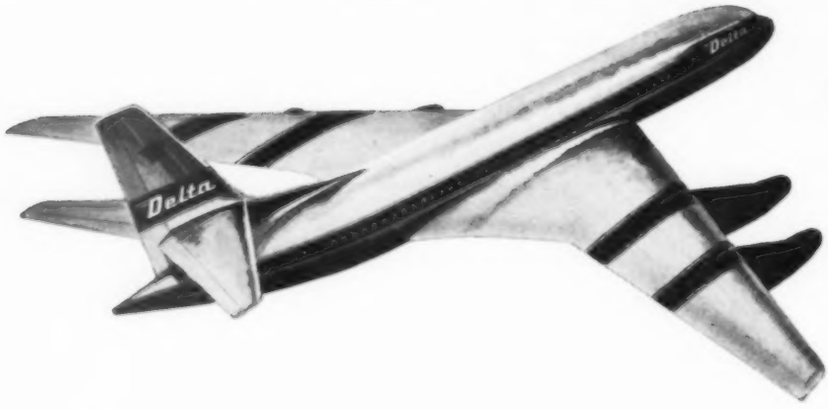
Will cut travel time in half: Fast new DC-8 jet airliners, powered by Pratt & Whitney J-57s, will start service to many Delta key cities in the fall of 1959.



Delta's new Convair jet transports will cruise at 609 m.p.h.; will serve Delta cities on 200 to 3,000 mile flights; will cut travel time Chicago to Miami by 2½ hours.

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AIR Report

Significant Trends and News

PIPER AIRCRAFT reports a 21% sales increase for the first quarter of its 1957 fiscal year, the figures being $6,456,133 as compared to $5,339,858 for the same fiscal 1956 period, with net profits after taxes of $681,394 versus $475,079. W. T. Piper, Sr., president, says the outlook for the second quarter appears equally promising. His commercial sales increased by 32%, consisting of 543 airplanes, and accounted for 40% of the entire production of the business aircraft industry for the period, which ended December 31. Piper's military sales decreased during the period.

BEECH AIRCRAFT reports $20,000,000 in sales for the first quarter of its 1957 fiscal year, a 17.5% gain over the same period of its 1956 fiscal year when sales were $17,000,000. Net earnings were $1.10 per share of stock versus 72 cents. Mrs. O. A. Beech, president, expects fiscal 1957 sales to top $97.5 million for a gain of more than 30% over last year's $74.5 million total. During the 1956 fiscal year, Beech commercial sales reached a new high of $32,091,761 and military sales were $42,447,187. Anticipated gains for both include a 45% increase in military business.

CESSNA AIRCRAFT reports its dealers broke all-time sales records last year with a volume of 3,233 business planes having a retail value exceeding $50 million. The breakdown was 72 Model 170, 1,419 Model 172, 530 Model 180, 983 Model 182, 223 Model 310 and 6 Model 195. As of last month, more than 450 twin-engine Model 310's had been delivered since production started in late 1954, according to Marketing Manager Frank Martin.

FERRY SERVICE COMPANY, headed by Bill Sparks with offices in Wichita and Lock Haven, specializes in business aircraft flyaway deliveries and reports it delivered 1,202 airplanes in 1956, averaging 5 airplane deliveries for each production day of the industry. This number is about 22% of the entire production of the industry, excluding military and airline aircraft. Sparks says his pilots now deliver more airplanes than those of all other commercial ferry organizations combined. Sparks ferries aircraft anywhere in the world.

RECENT EXPORT SALES of Cessna business planes included 10 Model 180's shipped to the Union of Burma at Rangoon and 8 twin-engine Model 310's ordered by Sabena Belgian Airlines, according to Export

(Continued on page 44)

TRIPLE-THREAT HELICOPTER PROSPECTING FOR MINERALS is performed by Aero Service of Philadelphia with this Sikorsky S-55. Booms fore and aft carry coils for a Newmont electromagnetic detector for copper, lead and zinc. A tear-drop case beneath tail boom carries a Gulf magnetometer for iron ore, ilmenite and asbestos. Inside is a scintillator for uranium. This copter can survey in one day more terrain than ground crews could survey in months.

FLIGHT MAGAZINE

FEBRUARY, 1957 VOL. 46, No. 2

THIS MONTH'S COVER is a ramp portrait of the efficient 4-place Mooney Mark 20. Powered by a 4-cylinder, 150-hp. Lycoming engine with controllable-pitch, constant-speed Hartzell propeller, it has 1,035-lb. useful load and 165-mph. cruising speed with 50-gal. fuel capacity. See page 24 for details.
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

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KLM Royal Dutch Airlines pioneers the overseas jet age with

Allison Prop-Jet Power

for its new fleet of Lockheed Electras

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A powerful turbine coupled with the high-propulsive efficiency of a propeller. Now setting new records in military transport, the Allison Prop-Jet will be backed by two years of flying before entering commercial service.

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KLM made this selection *after careful evaluation of all propeller-type aircraft power plants now built, or soon to be available.*

The 15,000 horsepower of the four Allison Prop-Jet engines will wing the Lockheed ELECTRA through the air at well over 400 miles per hour, cutting KLM's time schedules by 30% and providing new smoothness and quiet comfort over KLM's 152,000-mile air network.

What's more, it can operate out of "short-hop" airports with runways shorter than those required by today's four-engined transports.

In selecting Allison Prop-Jet power, KLM has demonstrated the same foresight that has marked the purchase of Allison Prop-Jet engines and Aeroproducts propellers by 5 major U. S. airlines—American, Eastern, National, Braniff and Western.

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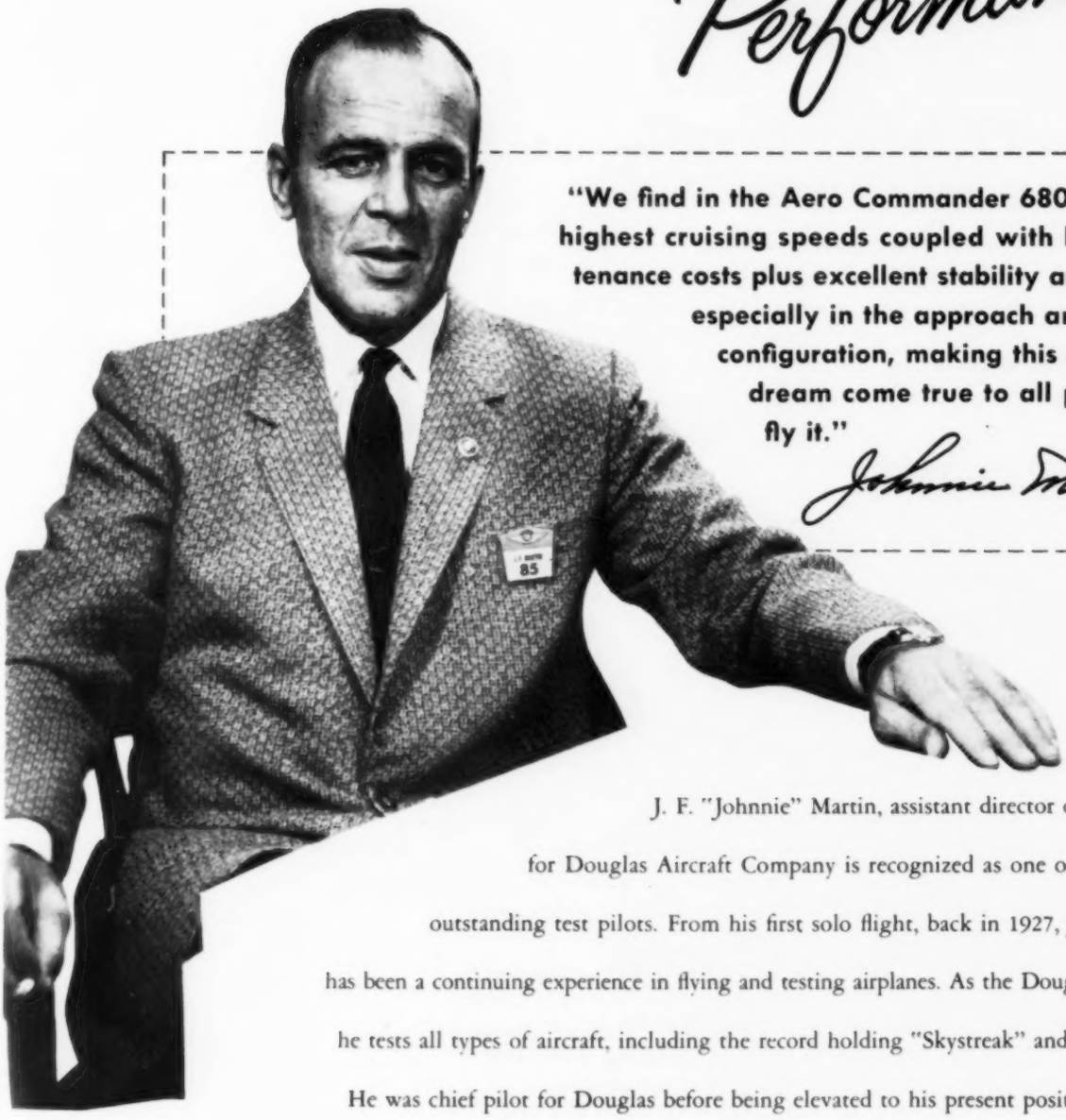

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J. F. "Johnnie" Martin, assistant director of Flight Test for Douglas Aircraft Company is recognized as one of the nation's outstanding test pilots. From his first solo flight, back in 1927, Johnnie's life has been a continuing experience in flying and testing airplanes. As the Douglas test pilot, he tests all types of aircraft, including the record holding "Skystreak" and "Skyrocket." He was chief pilot for Douglas before being elevated to his present position.

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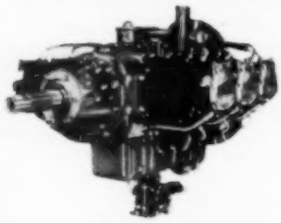

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(functionally, without running the engine)

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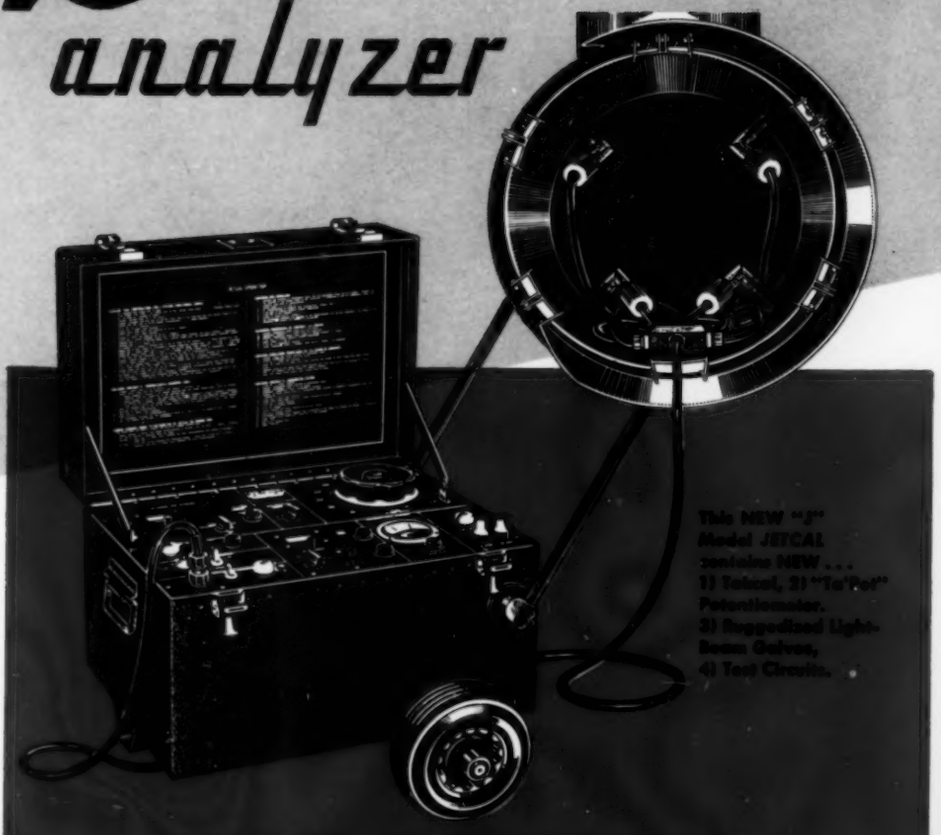

This NEW "J" Model JETCAL contains NEW . . .
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4) Test Circuits.

Two of the most important factors that affect jet engine life, efficiency, and safe operation are *Exhaust Gas Temperature (EGT)* and *Engine Speed (RPM)*. Excess heat will reduce "bucket" life as much as 50% and low EGT materially reduces efficiency and thrust. Any of such conditions will make operation of the aircraft both costly and dangerous. The *JETCAL Analyzer* predetermines accuracy of the EGT and (interrelatedly) Tachometer systems and isolates errors if they exist.

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3) Checks thermocouples within the harness for continuity.
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8) Checks EGT system with engine removed from aircraft (in production line or overhaul shop).
9) Checks aircraft TACHOMETER system accuracy from 0 to 110% RPM with guaranteed accuracy to within ±0.1% in the operating range.
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Compare its economy and performance and you, too, will want to get the most complete, most personal plane of all. It's the MARK 20 . . . and it is priced at only $13,750.

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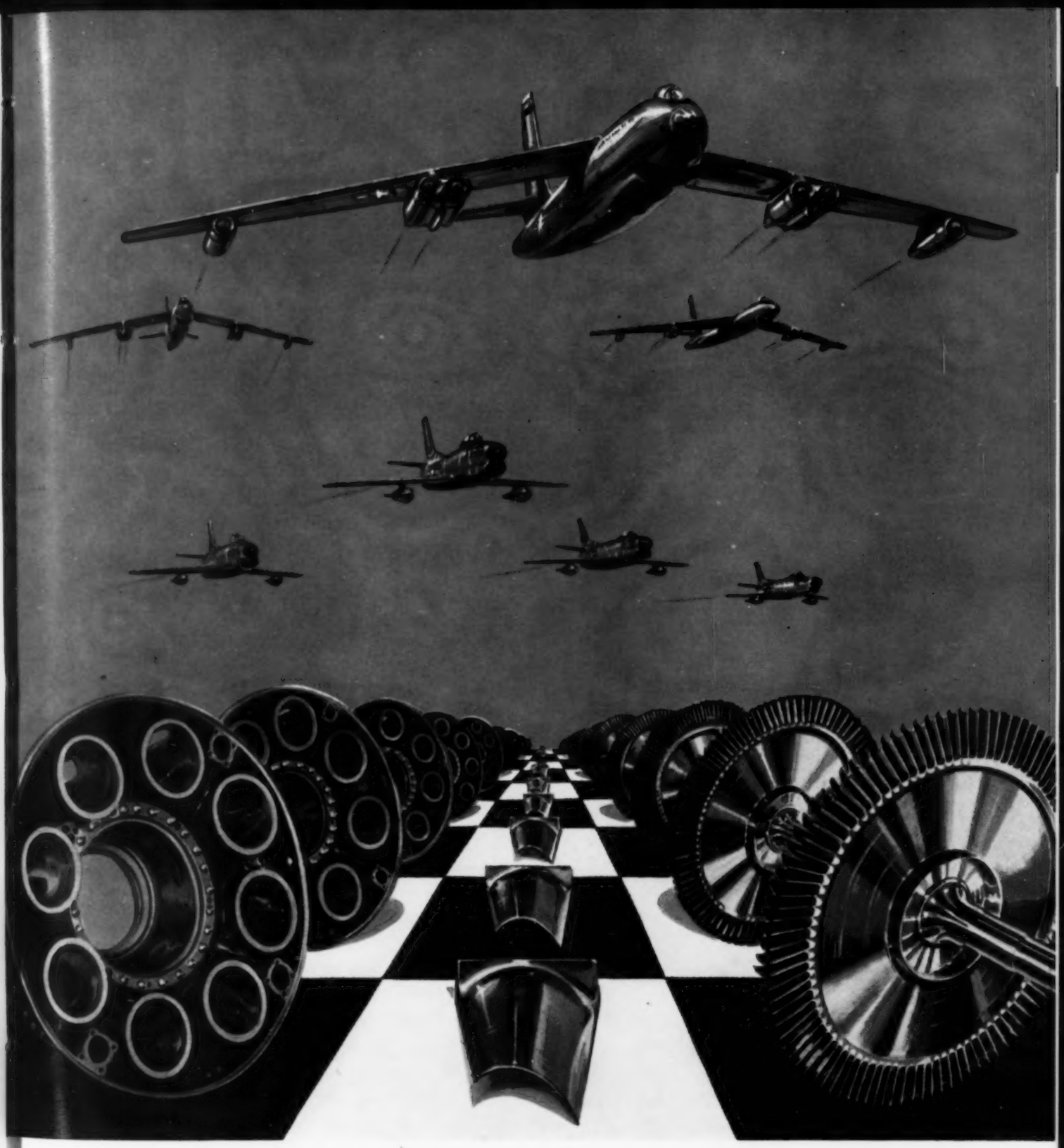

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SAC Silver Jubilee Newsreel

by JACK PATTON

Men, Moxey & Machines
WHO'S THAT— THOMAS A. EDISON?
SAC'S SHOPS WERE AMONG FIRST TO BE SCIENTIFICALLY EQUIPPED.
FIX THIS. FIX THAT!
NEXT!
EARLY-DAY MECHANICS WERE SKILLED JACKS-OF-ALL-TRADES.
30¢ AN HOUR! YIPES, WE'RE RICH!
GEO. KELLEY & W.J. CONNELL CAME FROM ARLINGTON STATE COLLEGE ... STILL WITH US.
YOU'RE FAMOUS TOO, SENOR, SOUSE OF ZEE BORDER!
AMONG FIRST BIG JOBS WERE FOUR PILGRIM MONOPLANES FROM MEXICAN AIRLINE.

Old Friends.. New Concepts

A salute to three old friends: Hal Henning (cockpit), Maj. W. F. Long (standing), and The Texas Company! Henning flew this Texaco Waco when, in late '33, he joined Doc Booth as partner. Today, SAC—Booth-Henning's offspring—and Texaco still are close co-workers in business aviation. Bill Long is our good neighbor, and Hal Henning is the much-admired chief of GMC air transport ops, Detroit.

LOCKHEED VEGA

FAIRCHILD

STINSON

New Friends.. Old Traditions

Booth-Henning began the SAC tradition of versatility in top-quality service for anything with wings, such as the early business planes seen above. For business flying, the military, and the airlines, quality and versatility remain synonomous with Southwest Airmotive. Here's a typical modern ramp scene.

1932 —A QUARTER CENTURY OF LEADERSHIP— 1957

Southwest Airmotive Co.

LOVE FIELD DALLAS

DIVISIONS: KANSAS CITY, KANSAS / DENVER, COLORADO

Just among ourselves

First Things First

A NUMBER of influential and well-meaning people and organizations are beginning to pick up the proposal that a national program of airstrip construction be included in the nation's multi-billion dollar express highway building program.

Offhand, the idea has a great deal of appeal and acknowledged merit because there's no question about the need for more places to land, house, fuel and base aircraft, particularly for the business and industrial airplane user. On the surface it appears to make sense to construct a nationwide system of airstrips with the same kind of road machinery at the same time the super highways are constructed and give them access to the highway by making them adjacent thereto.

We are all for the idea — if it can be worked. But we doubt that an airstrip program can be melded into the highway program on a 48-state basis with the assistance of the Federal government. It might work in a few states but the idea is impractical as a nationwide program.

Even if such airstrips were constructed in quantity where would the responsibility lie for maintaining them as usable surfaces? They need to be fenced, properly marked and mowed in the case of grass fields. If gravelled or hard-surfaced, the runway would have to be maintained. There is nothing more useless than an airstrip that's scraped out and then forgotten.

It seems to us that it would be more prudent to get a small airport program attached to the Federal Airport Aid Program with the solid endorsement of Congress and backed up by adequate planning and money. We don't believe the highway people, either at the Federal level or at many state levels, will entertain anything that so involves more land purchasing, surveying, engineering, fencing, grading, drainage, etc., not directly applicable to the highway program. Highway officials are no more interested in aviation development than the railroads are interested in highway development.

We had better start giving more thought and devoting more action to saving a lot of airports already built. A classic example of what we mean is being fought out in the courts at York, Pennsylvania, where the city and county fathers are trying to build an airport with local and Federal funds on a site just 2 miles from a commercial airport that's been serving the city for 17 years! Owned by fixed-base operator, Oscar L. Hostetter, the York Airport, boasting a 4,200-foot macadam runway, runway and beacon lights, gas, hangar and shop facilities, can be killed by approval of the present new site. And this is a nation devoted to free enterprise!

One of the most dangerous trends in commercial aviation in the postwar years has been the heavy attrition rate of privately owned airports near metropolitan centers which have been closed for housing, industrial or other high-cost land value developments. The larger cities and the CAA have shown regrettable short-sightedness in their failure to develop and encourage perimeter airports suitable for non-scheduled traffic, despite the very obvious fact that our large terminal airports can not take care of the growing traffic problem.

The time has come for all aviation interests to get together with local, state and Federal agencies and come up with a sensible long-range airport program that takes into consideration everybody's needs — not just the military and the large airlines. Unfortunately the Pentagon and U. S. airline leadership fail to comprehend that they would save themselves a lot of headaches to join in a campaign that would provide more airports for the growing business plane fleet, which right now is largely responsible for unbearable congestion at so many busy airports.

We would not say or do anything to discourage any person or organization or concerted effort trying to include an airstrip program in the super highway program now gaining real momentum. All power and success to the proposal. But to keep putting off a long-range expanded Federal airport program that can stand on its own feet, irrespective of any other form of transportation, based on its own necessities and the national interest, will be fatal and anything less will be half-baked and a case of just nibbling around the outside of the major issues.

Air Age Education

FOR many years our industry piddled around with all kinds of silly air education programs much to the amusement of educators and to the disgust of people who put up the money and got nothing in return. But many lessons were learned during those years of trial and error. Out of the mess came some light and a program originally spawned by the Civil Aeronautics Administration finally produced some outstanding educators throughout the nation who understood the deeper implications of the air age and how important it was to the nation — not to aviation — to prepare our school kids for a world whose affairs would be totally affected and changed by the airplane.

These educators, plus some enlightened members of the aviation industry long concerned with the pitiful results unilateral air education efforts were producing, banded together into the National Aviation Education Council. Out of this Council has come a realistic formula for air age education programming in our American school systems.

We have reviewed with great interest and respect the special teaching aids the Council has prepared with the help of recognized educators and technical aviation advisors — guides and instructional aids for teachers of science, mathematics and English for example — that have been received

FRONT of the new Lear ADF-12E

Lightest in weight • Easiest to operate • Less than half the cost

BACK of the new Lear ADF-12E—

10,000,000 hours of flying time logged by Lear ADFs

DATA
ON THE NEW LEAR
ADF-12E

Lear's ADF-12E is a phenomenally lightweight, compact, and inexpensive *combination ADF system* for executive planes—both single engine and "twins."

It combines:

1. A radio range and communications receiver.
2. A broadcast receiver.
3. An automatic direction finder—on range, beacon, and broadcast stations.
4. Power and modulation provisions to "drive" a Lear 12-channel VHF transmitter for standby or general use.

Powered for both loudspeaker and headphone operation, with *continuous tuning* on the three bands 190 to 440 kc; 420 to 900 kc; and 850 to 1750 kc.

10,000,000 logged flight hours behind Lear ADF design and manufacture assure the ADF-12E of even greater accuracy, smoother response, improved sensitivity, and unmatched reliability.

ADF-12E TUNER—Particularly designed for ease of operation. Featuring a sloping full reading dial, an operational press-to-test button for making indicator-swing test, and continuous tuning through its three bands.

AMPLIFIER—Compact, powerful, single-package unit designed for remote mounting. Contains power supply, amplification, and automatic control functions. Connects electrically, no flex shafting. 12 or 24 volt systems.

ADF LOOP—Lear's revolutionary Ferro-Dynamic® Loop is electrically driven, small, compact, and light in weight. Hermetically sealed with electrical error corrector for greater accuracy.

AZIMUTH INDICATOR—Connects electrically—no flex shaft—thus, simplified installation.

POWER OUTPUT: 3 watts max.; 1.2 watts undistorted.
POWER USE: Max. 3.3 amps. at 28 v.; 5.7 amps. at 14 v.
WEIGHT: Tuner, amplifier, loop, indicator—total 17.3 lbs.
TUNER DIMENSIONS: Lgth 8⅜"; width 6⅜"; hght 2⅞".

DUAL INSTALLATIONS of the Lear ADF-12E (for "running fixes," IFR use, maximum all-weather safety, etc.) weigh less and cost less than average single ADF installations.

For complete details see your nearest Lear dealer or write directly to LearCal Division, 3171 South Bundy Drive, Santa Monica, California.

LEAR

with gratitude by many scores of schools throughout the land.

For an annual service fee of only $5, the National Aviation Education Council, with offices at 1025 Connecticut Avenue, N. W., Washington, D. C., sends to schools, libraries or teachers throughout the year single copies of all NAEC publications, three magazine subscriptions, a monthly fact sheet, "Skylights," and a large quantity of aviation pictures, pamphlets, charts and booklets. It's the biggest bargain in aviation. FLIGHT MAGAZINE recommends without reservation the purchase of gift memberships at $5 each for school teachers, principals and librarians in both grade schools and high schools, especially if the donor has a child or children attending such institutions.

NAEC has come up with the answer to the long-unsolved, proper approach to our air age education problem. To Evan Evans, the executive director, and his hard working staff, all thanks and gratitude from an industry that is beginning to recognize the value of his untiring efforts to build a stronger America.

Airfreight Revolution In The Making

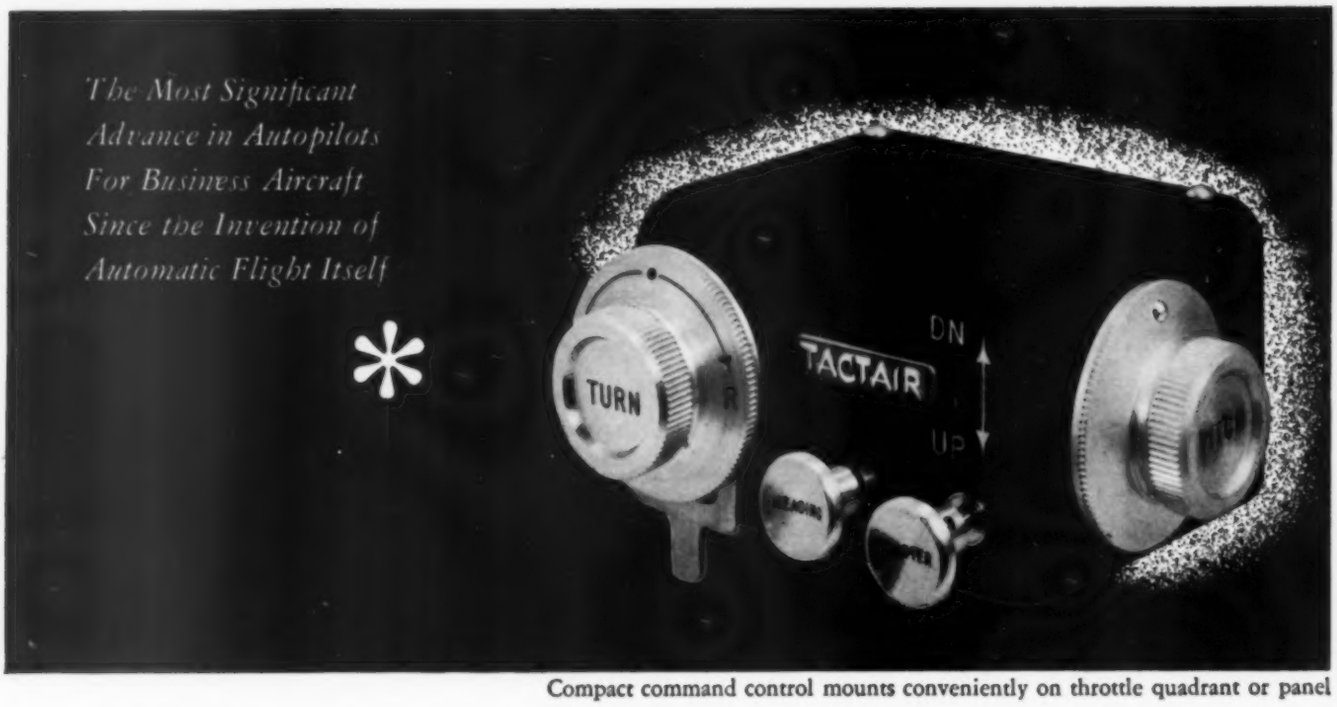
DELOS C. Rentzel, the most visionary and energetic executive ever to head both the Civil Aeronautics Administration and the Civil Aeronautics Board, now chairmans Slick Airways and has launched that hard-selling airfreight pioneer on a five-year growth program which will make even the most enthusiastic aviation planner sit up and take notice.

Slick has just buttoned up some $12,000,000 in new financing, including railroad money (heretofore largely untouchable by aviation) oil country money (with which Earl Slick not only started his air cargo venture but has kept supplying in large amounts), bank money and other kinds of hard cash. Financing in even greater amounts is inevitable, for the erstwhile small air cargo operation and its over-worked pool of war-surplus transports is headed for the big-time as represented by such time-proved institutions as a fleet of 25 Douglas DC-6A airfreighters and the J. P. Morgan & Company, Inc.

The Rentzel plan is for Slick to top off its five-year expansion by flying freight competitively with truck and rail less-than-carload-lot rates.

Rentzel expects to do nothing less than revolutionize the business and those who know his capabilities with trucks as well as airplanes, and the Slick-allied Chesapeake and Ohio Railway's capabilities with railroads, believe he has the formula and can do it. For one thing, railway and truck profit-earning performance is already at or very close to its topmost limitation and must hereafter bear the burden of higher labor and operating costs, while the DC-6A is merely a step removed from turbine-powered airfreighters having twice the speed and many times the payload capabilities.

THREE GENERATIONS OF PILOTS—Hugh A. Drane, Sr., widely-known pioneer private pilot (center) poses with his son, Dr. Hugh A. Drane, Jr., (right) and grandson, Stephen T. Drane, on occasion of Stephen's solo flight on his sixteenth birthday. Hugh Drane, Sr., who resides on his Arcadia Farms near Corsicana, Texas, learned to fly in 1930 despite the incapacity of only one arm. He gained national prominence two decades ago when he owned and expertly flew a stagger-wing Beechcraft on a physical waiver. Drane, Jr., soloed in 1940 and was an Air Force flight surgeon in the Pacific theatre during World War II. He is a practicing physician in Kerrville, Texas, where his son, Stephen, is logging time regularly. —(FLIGHT MAGAZINE Photo by Ted Hinton.)



Compact command control mounts conveniently on throttle quadrant or panel

TACTAIR 3-DIRECTIONAL AUTOMATIC PILOT

* **Pneumatically operated —**
  no motors, no tubes, no warm-up, no power drain
* **Less than 10 pounds total installed weight**

THE OUTCOME OF THREE YEARS' RESEARCH WORK on automatic flight for the U. S. Navy, the Tactair T-3 three-directional autopilot is now offered, fully proven, fully flight tested, for business aircraft.

The Tactair T-3 completely revolutionizes the concept of performance, accuracy, light weight and reliability for automatic flight in business airplanes. It operates pneumatically from the aircraft's vacuum system — no additional pump needed. It involves no motors, no tubes, no warm-up, no power drain. Powerful pneumatic "muscles" do the job smoothly, effortlessly, with no complicated follow-up systems, no constantly working clutches.

The result: unprecedented accuracy, unmatched smoothness, reliability and weight-saving — only 7.3 pounds. Total cost including installation kit, $2,395.

The Tactair T-3 autopilot is manufactured and backed by Aircraft Products Company, whose engineering and precision manufacturing techniques have overcome some of the toughest hydraulic and pneumatic system problems for major jet aircraft manufacturers.

EXCLUSIVE HEADING LOCK AND HEADING MEMORY

The Tactair T-3 automatic pilot holds any compass course to the exact degree desired — an inestimable advantage in flying VOR or ILS localizer track.

It's done by Tactair's exclusive heading selector incorporated into a standard directional gyro. If you wish to fly a course of, say, 312° you set the upper course card to 312°. Engage the heading lock button and the Tactair T-3 automatically turns the airplane to a 312° heading. From then on, it stays on the gyro heading, *locked to the exact degree*. If you turn the airplane manually from the preset heading, then release the controls, it returns automatically to 312°, thanks to Tactair's exclusive *heading memory*.

If you wish to alter course, to correct for wind drift on VOR or ILS track for instance, merely reset the gyro course selector to the desired new heading.

Three-axis control sensing is derived from ingeniously modified directional gyro and artificial horizon, supplied with each installation kit. Directional control is sensed from the DG, pitch and roll from the horizon. The sensing units have no mechanical or electrical contact with the basic gyro instruments, thereby eliminating any adverse effect on gyro operation.

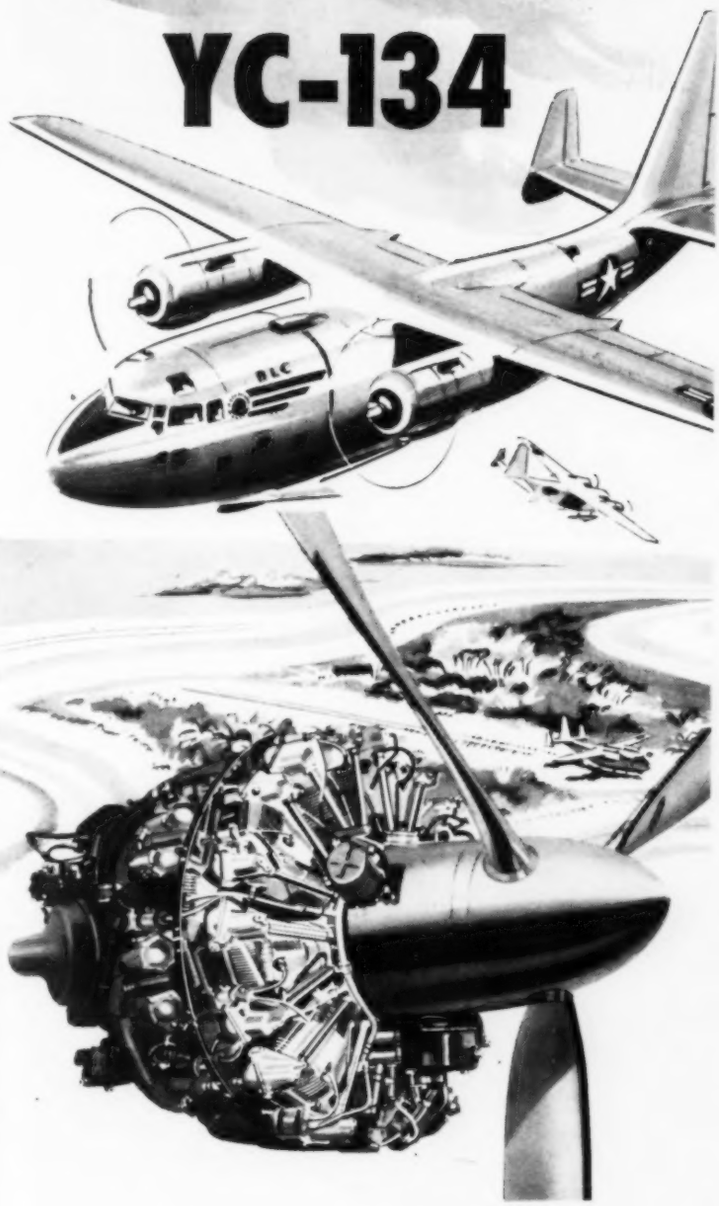
Turns up to standard 3° per second are made automatically by moving the "Turn" knob on the face of the command control.

WRITE FOR COMPLETE DESCRIPTIVE BROCHURE

TACTAIR INCORPORATED AUTOPILOT DIVISION | AIRCRAFT PRODUCTS CO.
BRIDGEPORT, PENNSYLVANIA

FOR 16 YEARS SPECIALISTS IN PRECISION AIRCRAFT PNEUMATIC AND HYDRAULIC CONTROLS

USAF
Pantobase
Boundary Layer Control
STROUKOFF
YC-134



powered by
TURBO COMPOUNDS
for extra range and lift performance

The U.S. Air Force can operate its rugged new Stroukoff YC-134 cargo transport almost anywhere. With the advantages of its special Pantobase landing system, combined with boundary layer control, plus the powerful performance of the Curtiss-Wright Turbo Compound® engine, the YC-134 can take off and land in unbelievably short distances . . . upon ice, water, snow, unimproved terrain, sand, slush and mud, as well as standard runways.

The Turbo Compound is the ideal powerplant for this high-performance addition to the assault and logistics strategy of the USAF. Built to take the punishment of roughest day-in, day-out operation, the Turbo Compound also provides the power necessary for the YC-134's extremely short take-off, heavy lift performance . . . plus the fuel economy for extended range operations.

Selected by 41 of the world's leading airlines to power the world's fastest commercial transports . . . as well as by the military services of the U.S. and NATO Nations . . . the Turbo Compound provides 3400 to 3700 horsepower for take-off, 150 *extra* horsepower for getting heavy loads to altitude faster, and *designed-in* power reserve for tomorrow's still greater speeds and loads.

World's Finest Aircraft Engines

WRIGHT AERONAUTICAL DIVISION
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CORPORATION • WOOD-RIDGE, N. J.

HERE'S WHY THE *Apache* OUTSELLS ALL OTHER TWINS

More Piper Apaches—nearly 1,000 of them—have gone into corporate service in the past three years than any other executive twin because the Apache combines all the advantages of round-the-clock, twin engine transportation with *economy* and superb comfort. Your choice of three cabin arrangements—standard four-place, four-place version with two reclining airline-type seats, or five-place version with five individual seats. Three attractive three-tone color combinations with matching interior are offered.

The Apache's performance and rugged stamina have been proved beyond question. 170 mph cruising speed, range up to 1,200 miles, good instrument flight characteristics. Proved by 25 routine transatlantic delivery flights, summer and winter, including one, non-stop 3,600 miles, New York to Paris. Powered with two 150 hp Lycomings, the finest executive plane engines available, the Apache has excellent single engine performance—fully loaded will maintain 6,750 feet on one engine.

The Apache's utility is unmatched because its slow 52 mph stalling speed permits use of the smallest airports. Economically, too, the Apache is in a class by itself. Priced at half the cost of most available twins, the Apache has correspondingly lower depreciation, insurance and direct operating costs.

See your Piper dealer for a demonstration. You'll see it's good business to fly the Apache. For fully detailed catalog write Dept. F-2.

PIPER
AIRCRAFT CORPORATION
Lock Haven, Pennsylvania

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

TWO HEADS are better than one...

ARC's Course Director CD-1, Teamed with ARC's VOR/ Localizer Receivers 15-D, Shares the Work with the Pilot

More and more pilots rely on the ARC CD-1 Course Director to determine the exact headings required to intercept and fly a desired VOR radial or runway localizer. This electronic "co-pilot" helps them fly with pinpoint precision, greater ease and increased safety, and in four simple steps.

With ARC's CD-1, the pilot selects his VOR or localizer station, sets his Course Director to the bearing of the desired VOR radial or localizer, turns his aircraft until the vertical needle of the cross-pointer meter is centered and steers to keep it centered. His ship will intercept the selected track quickly and smoothly, simultaneously compensating for wind drift. The pilot performs no mental computations, and there's no chance of overshooting the desired course.

This reliable navigational aid adds only 10 pounds to your aircraft. Ask your ARC dealer to install the CD-1, along with a *dual installation* of ARC's Type 15-D VOR/Localizer Equipment. You'll discover how easy flying VOR and Localizers can be – and with new peace of mind.

Miniaturized Automatic Direction Finders
Omni/Loc. Receivers • Course Directors • UHF and VHF Receivers and Transmitters
LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt Audio Amplifiers • Interphone Amplifiers • Omnirange Signal Generators and Standard Course Checkers • 900-2100 Mc Signal Generators

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Dependable Airborne Electronic Equipment Since 1928

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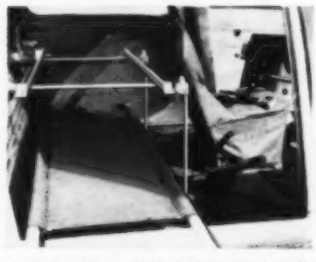
Presenting the **BELL RANGER**

Versatility Unlimited!

QUICK-CHANGE FLOAT INSTALLATION



TWO-PATIENT LITTER-KIT INSTALLATION

Newest of the famous Bell Model 47 family, the Ranger is truly an all-purpose helicopter with unlimited versatility.

This fast, powerful addition to the Bell fleet defies severe weather and rugged terrain. In a matter of minutes its luxurious executive interior can be converted to cargo carrier, aerial ambulance or rescue conveyance ...its internal hoist can be completely installed in five short minutes.

For the complete story of this great new four-place business aircraft, write, wire or phone...Sales Manager, Dept. JA-3 P. O. Box 482, Fort Worth, Texas.

BELL Helicopter CORP.

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Subsidiary of Bell Aircraft Corp.

Important news for all corporate and private flyers...

Super Ventura and Beechcraft Bonanza

A new development for **all** types of aircraft engines

Here's a new detergent-type oil *for all types of aircraft engines*—whether they're horizontally opposed, inline or radial! It keeps all kinds of aircraft engines cleaner than was ever possible before with non-detergent oils . . . *without* developing any undesirable side effects.

The secret? New Gulfpride Aviation Series D combines Gulf's exclusive Alchlor Refining with a remarkable new "detergent additive."

Cleaner engines

Experience in all kinds of service proves New Series D greatly *reduces carbon, coke and varnish collection* around rings and valve stems. *Eliminates harmful deposits* in the combustion chambers.

More hours between overhauls

New Series D offers you an unusually tough lubrication film, too. *Cuts down wear on engine parts substantially.* The result? Far lower *operating* and *maintenance* costs! Safer *engine performance!* Why not try it and see for yourself?

New

GULFPRIDE AVIATION SERIES D

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AVIATION PRODUCTS

Here is the ideal protection for wiring assemblies requiring a high degree of environmental resistance without the use of metal conduit.

Scinseal, originated and developed by the Scintilla Division of Bendix*, is a multi-purpose thermo-plastic material designed to protect and seal vital wiring assemblies from every operational hazard.

By the combination of plasticizers, stabilizers, pigments and fillers, Scinseal has been formulated to meet the requirements of many adverse conditions.

For example, one usage may require low-temperature flexibility, while another is concerned primarily with a high temperature condition, and still other applications may present fuel and acid problems—or perhaps a combination of all of these characteristics is the desired result.

That is why Scinseal is virtually a miracle material, for it can be "tailored" to meet a wide range of requirements, and at the same time, minimize the weight of the finished product.

Scinseal can be provided in a variety of solid colors, and can be hot stamped to provide positive identification. Many electrical connector adapter molds are available, as well as the T's, Y's and variable molds necessary to provide reliable assemblies of any configuration.

Detailed information and data on Scinseal available on request.

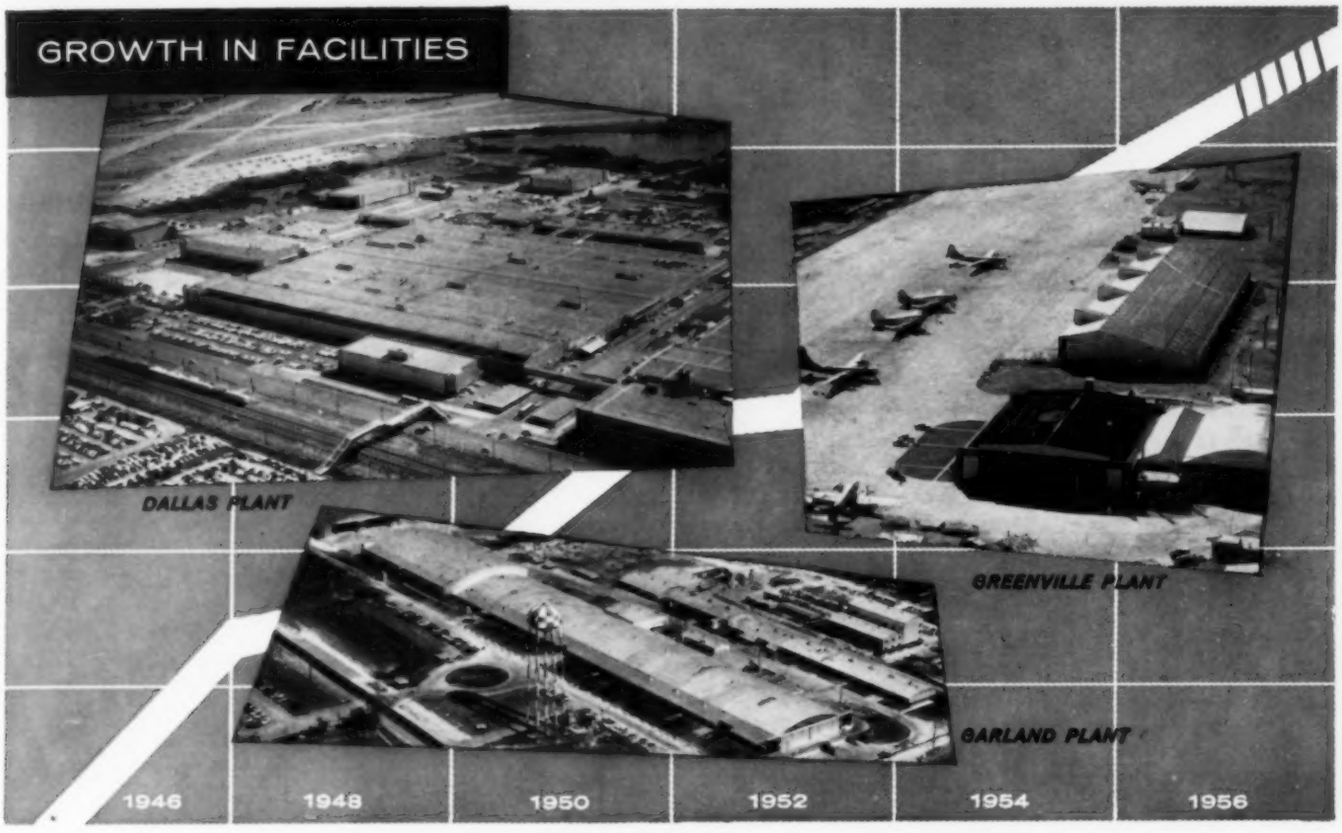
*TRADEMARK

Can be tailored to meet individual needs and purposes

Scinseal is used in such specialized fields as underwater devices, ground radar equipment, missile control wiring.

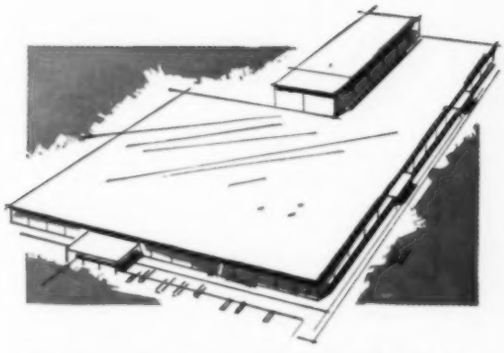
SCINTILLA DIVISION OF BENDIX AVIATION CORPORATION
SIDNEY, NEW YORK

Bendix
SCINTILLA DIVISION
Bendix AVIATION CORPORATION



At Temco GROWTH tells the story

Growth — in plant facilities, for example, tells the Temco success story.



NEW ENGINEERING CENTER is being built with growth in mind. Initially large enough for a force of 900 engineers, it is designed to permit rapid expansion of any functional area without disturbing work in progress.

New buildings — like the completely modern 100,000-square-foot engineering center opening this spring at Temco's Garland plant — clearly tell the Temco story of widening engineering skills, increasing contracts and significant advances in Temco's own projects.

At the beginning — back in 1945 — 550,000 square feet were sufficient. Now, eleven years later, with three integrated Texas plants at Dallas, Garland and Greenville, Temco has a total of 1,900,000 square feet for administration, design and production — plus eight runways and an immense total ramp area.

Completely modern facilities are only a part of the Temco story of outstanding engineering opportunities. The challenge of meeting the complex needs of the jet-age aircraft industry, plus advanced work in Temco's own developments in electronics, aircraft and complete weapon systems means that rewarding careers are open to you now at Temco.

ENGINEERS — *Openings in all phases of aircraft design and development. Write to Joe Russell, Engineering Personnel, Room 10-C, Temco Aircraft Corporation, Dallas, Texas.*

TEMCO

AIRCRAFT CORPORATION • DALLAS

One hundred copies of the 4-place Mooney Mark 20 have been produced. This low-wing speedster has a 4-cylinder, 150-hp. Lycoming engine and controllable-pitch, constant-speed Hartzell prop, with manually-operated retractable gear and flaps. Using 150-hp., top speed is 171 mph. at sea level. Using 112.5 hp., it cruises 165 mph. at 4,900 ft., and on 55 per cent of power, using 82.5 hp., it cruises 150 mph. at 10,000 ft.

—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

Easy On The Pocketbook

Mooney tops in efficiency on 2,400-mile trip

By GEORGE E. HADDAWAY

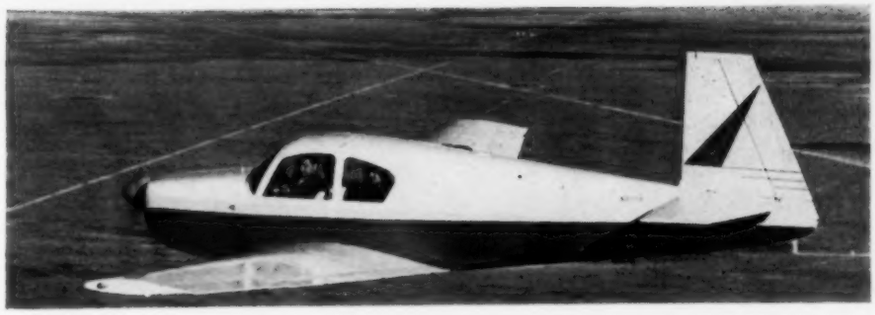
EVER since Al Mooney developed the Culver Cadet back in the 1930's we've been numbered among the many apostles who recognized and appreciated his genius and the significant contributions the ruddy Irishman made to lightplane design progress. Although Al has moved up into the big leagues as an engineer with Lockheed he certainly can look back with pride on his crowning and final achievement of his lightplane career — the Mooney Mark 20, one hundred of which have rolled off the production line at Kerrville, Texas.

Last month we had the pleasant opportunity of getting acquainted with the 1957 Mooney Mark 20 on a two-day flight which was equivalent to a transcontinental trip from Los Angeles to Washington, D. C. Our itinerary was non-stop Dallas to Miami, Florida, returning the next day with one stop for lunch and gas with the Key Brothers at Meridian, Mississippi. What originally had been planned as a routine cross-country familiarization flight of the new model turned out to be something of a record-making accomplishment.

Two more views show the trim lines of the Mooney Mark 20. Note squared-off wingtip's airfoil section; wide 9-ft. tread, short landing gear and visibility over the nose.

—(FLIGHT MAGAZINE Photos by Tom W. Collins.)

Cruising along on the step, the 4-place Mooney offers effortless flying at its best. It has 49-gal. fuel capacity for 750 miles at 165 mph. and 4,900 ft. in 4.6 hrs. with 15-min. reserve and 900 miles at 150 mph. and 10,000 ft. in 6 hrs. with 15-min. reserve.
—(Mooney Aircraft Photo.)



Especially on the way down! Norm Hoffman, energetic Mooney Vice President in charge of sales and companion on the flight, couldn't have picked a better day for the voyage. A screaming mass of cold, dry air roared down from Canada the night before, cleaning out the scud of the previous week and presenting us with a tail wind of from 20 to 40 knots practically all the way. As a consequence we made the 1,220 miles to Miami non-stop in 6 hours, 23 minutes at an average ground speed of 190 miles an hour! And we burned 44.4 gallons of gas, or an average of 6.8 gallons per hour. Upon landing we found we had about 45 minutes reserve and the gas bill came to only $15.98! We didn't use any oil at all.

After a half-day's work in the office we departed Love Field, Dallas, at 12:30 p. m. filing a VFR flight plan to Tallahassee, Florida, estimating the 768-mile leg in 4 hours, 20 minutes. We climbed for 25 minutes to 12,000 feet. Hoffman estimates consumption at 12 gallons per hour in the climb. Power setting at 12,000 ft. was 2,100 rpm. and 19 ins. manifold pressure. We figured this out on the power curve and came up with under 50% horsepower. We indicated between 123 to 127 mph. which trued out at 154 mph. with an outside air temperature of 40 degrees F. We were over Tallahassee 17 minutes ahead of schedule and kept going, filing a DVFR flight plan direct to Miami.

The only overcast was along the Gulf Coast near Cross City and when we were over Orlando we knew we had it made. A bright half moon and the comfortable perch at 12,000 feet made us appreciate the glories and exhilaration of night flight all over again despite the complaints of many who condemn single-engine night operations. We felt secure with the

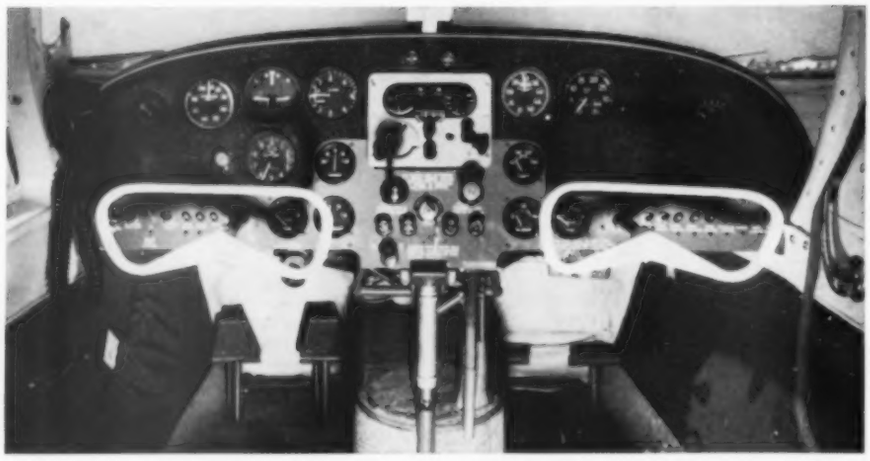
Flight Log — Mooney Mark 20
Dallas-Miami Non-Stop

FROM	TO	Miles	Depart	Arrive Over	Elapsed Time	Ground Spd., mph.
Dallas (take-off)	Shreveport	180	12:30	13:34	1:04	169½
Shreveport	Mississippi River	163	13:34	14:23	:49	202
Mississippi River	Laurel	119	14:23	15:00	:37	190
Laurel	Marianna	248	15:00	16:15	1:15	199
Marianna	Tallahassee	58	16:15	16:33	:18	191
Tallahassee	Cross City	102	16:33	17:05	:32	194
Cross City	Orlando	130	17:05	17:45	:40	194
Orlando-WPB	Vero Beach	90	17:45	18:13	:28	191
Vero Beach	Miami (land)	130	18:13	18:53	:40	194
Average or Total		1,220	12:30	18:53	6:23	190.7

Return Flight — Mooney Mark 20
Miami-Dallas One-Stop

FROM	TO	Miles	Depart	Arrive Over	Elapsed Time	Ground Spd., mph.
Miami (take-off)	Vero Beach	130	09:11	10:00	:49	159
Vero Beach	Orlando	90	10:00	10:30	:30	180
Orlando	Cross City	130	10:30	11:22	:52	150
Cross City	Tallahassee	102	11:22	12:06	:42	144
Tallahassee	Marianna	58	12:06	12:28	:22	157
Marianna	Evergreen	140	12:28	13:23	:55	153
Evergreen	Shubuta	85	13:23	14:00	:37	137
Shubuta	Meridian (land)	34	14:00	14:16	:16	126
Meridian (take-off)	Shreveport	295	14:45	16:46	2:01	148
Shreveport	Dallas (land)	180	14:46	18:00	1:14	147
Average or Total		1,242	On Gr.	:29	8:20	148

Plan-form of the Mooney Mark 20 is shown in this bank, revealing its long flaps, landing gear doors and clean lines. At 2,450-lb. gross, useful load is a hefty 1,035 lbs., providing a payload of 4 people and 46 lbs. of baggage with full tanks.
—(Mooney Aircraft Photo.)



The Mooney Mark 20's wide instrument panel has plenty of space available for additional indicator and radio installations. Dual controls are standard. Levers in front of panel are for landing gear (left) and flaps.
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

knowledge we could glide into a choice of the many airports that dot the Florida landscape, especially below Orlando.

In the climb-out after take-off at Love Field I was impressed with the performance above 10,000 feet. Between 10,000 and 11,000 we climbed 450 fpm. at 105 mph. indicated. Between 11,000 and 12,000 we climbed 500 fpm. and indicated 90 mph.

Levelling off at 12,000, which we figured our best tail wind altitude without oxygen, climb time was 25 minutes. The gas capacity of the Mark 20 is 49 gallons, two main tanks of 17.5 gallons each and an auxiliary of 14 gallons. We took off on the left main tank and climbed out using Hoffman's estimated 12 gallons an hour for climb. We then switched to the auxiliary immediately on reaching our cruising altitude, noting the time it took to get there. We ran the auxiliary dry, which gave us our exact cruise consumption at that altitude and temperature. Then we switched to the right main tank and burned down to a 45 minute reserve. Switching back to the left main tank which was used for the climb-out, we ran it dry. This is a simple, foolproof system and Mooney recommends it for all flights, short or long.

I recommended an omni-to-omni flight, the kind the average businessman owner would take, with no short cuts over water. Our route therefore took us from Dallas via Shreveport, the Mississippi River, Laurel, Marianna, Tallahassee, Cross City, Orlando, Vero Beach and Miami. Elapsed time was 6 hours, 23 minutes and total tachometer time was 6:30 minutes. Hoffman seemed a bit disappointed that our consumption figured out 6.8 gallons an hour as the previous Mark 20 had often given him under 6 gal-

(Continued on page 60)

Attractive cabin of the Mooney has 40-in. seats with 38-in. headroom between seat and headliner. Front seats are on tracks and slide all the way back. New door has positive air-seal closure.
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

Mooney Mark 20
1957 Factory Data

Power Plant: 4-cylinder Lycoming Model O-320 Engine, rated at 150 hp. at 2,700 rpm. at sea level, driving 74-in. Hartzell all-metal, controllable-pitch, constant-speed propeller.	
Price	**$13,750**
No. Seats	**4**
Gross Wt., lbs.	**2,450**
Empty Weight, lbs.,	**1,415**
Useful Ld., lbs.	**1,035**
Payload with full tanks — Four people plus 46 lbs. baggage	
High Spd., sea level, mph.	**171**
Cr. Spd., 75% hp. at 4,900 ft., mph.	**165**
Cr. Spd., 55% hp. at 10,000 ft., mph.	**150**
Stall Spd., landing with flaps, mph.	**57**
Rate of Climb, fpm.	**900**
Clng., ft.	**20,000**
Svc. Clng., ft.	**17,200**
Fuel Cap., gals. usable	**49**
Range with 15-min. res. — 750 mi. in 4.6 hrs. at 165 mph. using 75% hp. at 4,900 ft. 900 mi. in 6.0 hrs. at 150 mph. using 55% hp. at 10,000 ft.	
Span, ft.	**35**
Length, ft.-ins.	**23-2**
Height, ft.-ins.	**8-4.5**
Tread, ft.-ins.	**9-¾**
Wing Area, sq. ft.	**167**
Aileron Area, sq. ft.	**11.1**
Flap Area, sq. ft.	**17.2**
Hor. Stabilizer, sq. ft.	**21.5**
Elevator Area, sq. ft.	**12.0**
Rudder Area, sq. ft.	**7.9**
Vertical Fin Area, sq. ft.	**5.0**
Wing Loading, lbs. per sq. ft.	**14.7**
Pow. Loading, lbs. per hp.	**16.3**
Front Seat Width, ins.	**40**
Rear Seat Width, ins.	**40**
Height, Front Seat to Clng., ins.	**38**
Height, Rear Seat to Clng., ins.	**38**
Leg Room, from rudder pedals to back of front seat, ins.	**36.5-41.5**
Bag. Compt. Width, ins.	**36 to 38**
Bag. Compt. Height, ins.	**21**
Bag. Compt. Length, ins.	**17 to 24**
Bag. Compt. Vol., cu. ft.	**9**
Bag. Compt. Cap., lbs.	**120**

NOTES: All performance is at gross weight and sea level unless noted. Empty weight includes sensitive altimeter, rate of climb, turn and bank, cylinder head temperature gauge and dual controls as standard equipment. This is a low-wing, tricycle airplane with manually-operated retractable gear and flaps. Wing is laminar-flow design using NACA section 641-415 at tip with 632-215 at root. Cabin section of fuselage is of steel tube frame aluminum covered; aft section is aluminum monocoque construction; wing and empennage constructed of pressure-bonded, laminated spruce, treated and sealed for the life of the airplane.

The hand in this photo holds one of the simple snap-out pins used to assemble components of the XROE-1 rotorcycle.
—(Hiller Photo.)

Hiller Rotorcycle

A ONE-MAN, collapsible rotorcycle developed for the U. S. Navy by Hiller Helicopters of Palo Alto, California, lifts more than its own weight and comes pretty close to being a helicopter which can be strapped to a man's back.

Called the XROE and designed for use by the Marines for observation, liaison and small-unit tactical maneuvers, the Hiller hopper features assembly with quick-release "pins" by one man in less than 10 minutes. It collapses into a compact package for easy transportation or parachute drop to troops in the field.

Complete with rotors, 4-cylinder 2-cycle engine and everything needed for assembly and flight, the XROE weighs less than 250 lbs. It has an 18-ft. rotor and its small tail rotor is mounted on a tubular boom. The pilot sits on a motorcycle-type seat out in the breeze, astride one of the three tubular landing gear legs with the motor at his back, a small fuel tank above near the rotor head and a control stick hanging down from the rotor head. The engine is an aircooled Nelson gasoline motor produced by Barmotive Products, Inc. and of a type proved in target aircraft and powered sailplanes.

These two views show the one-man Hiller heli-hopper for the Marines flying, assembled on the ground and disassembled as a portable package for easy transportation or parachute drop to troops in the field. Note folded rotor, lightweight tailboom with anti-torque rotor and motorcycle seat. It weighs less than 250 lbs. Pilot is Richard L. Peck, Hiller test pilot.
—(Hiller Photos.)

The first five Cessna twin-jet T-37A trainers delivered to the Air Force are pictured in close formation. Output will reach 17 T-37A's monthly by mid-summer. —(Cessna Photo.)

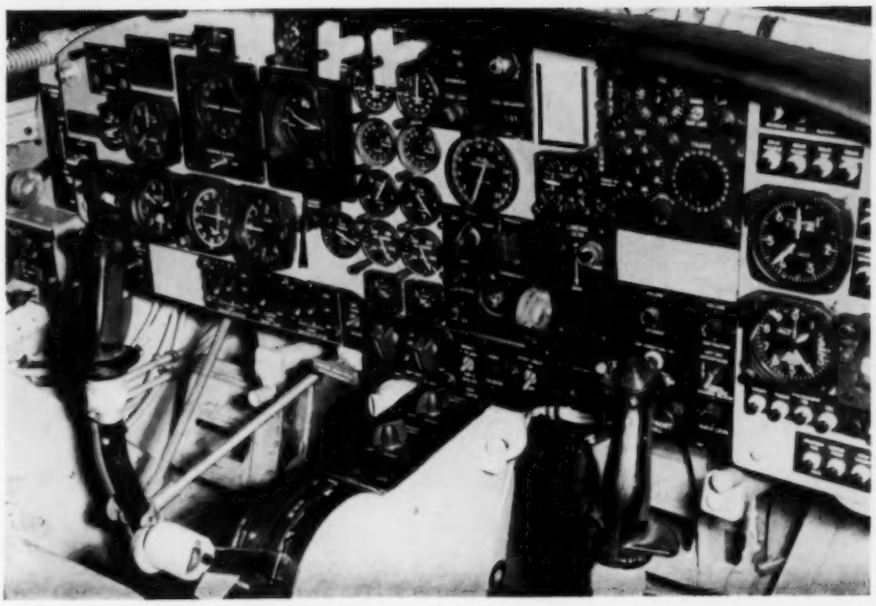
First Cessna Jets In Training

THE Flying Training Air Force has begun "Project Palm," a primary flight training evaluation of Cessna's new two-place, twin-jet T-37A trainer, first Air Force light jet and first side-by-side trainer.

Ten instructors from civilian contract schools conducting Air Force primary training will complete courses in T-37 upgrading and maneuver refinement in the new jets on March 7 at James Connally Air Force Base in Waco, Texas. They will be followed on March 11 by 14 Air Force stu-

Flying Training Air Force officers picked up their first T-37A's at the factory in Wichita last month, ferrying four to Connally Air Force Base at Waco, Texas, and one to Eglin Air Force Base, Florida. —(Cessna Photo.)

Maj. Ray Rogers (right), in charge of Project Palm for student flight training evaluation of the new-type trainer, explains the T-37A panel for Daniel January, a civilian instructor undergoing academic training.
—(Air Force Photo.)



Elaborate instrumentation for T-37A includes many devices never required in piston-engine light trainers, such as fuel flow meters; complete radio and electronic gear; controls for heat, ventilation, defrosting, speed brake, spoilers, thrust attenuators, high-altitude oxygen, canopy operation and even ejection seats. Stick grips and throttle quadrants are fighter-type.
—(Cessna Photo.)

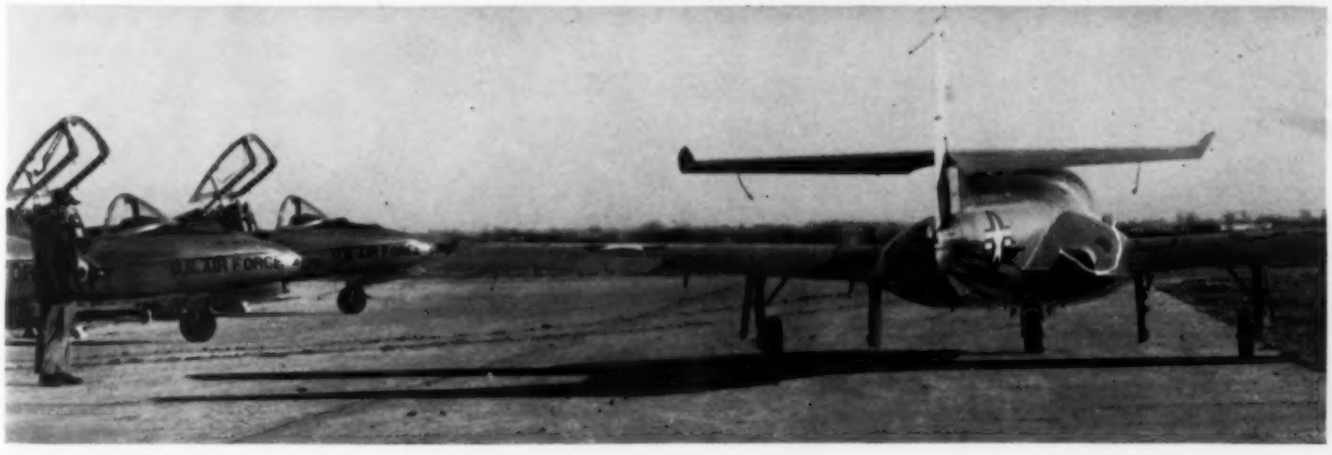
dents with 40 hrs. of T-34 training and on March 25 by 6 Air Force students with 20 hrs. of T-34 training. All will receive 150 hrs. in the T-37, 30 academic hours and 8 hours of high altitude indoctrination before winding up the project next October.

Meanwhile, the T-37 is in volume production at the Cessna factory and will reach an output of 17 twin-jet trainers per month by mid-summer. Cessna is ahead of schedule with the building of the new Wallace Plant to expand T-37 production. The new trainer recently completed a 500-hr. test program at Edwards Air Force Base where it set a new maintenance operating availability endurance record for jet aircraft.

Flyaway delivery of the first five T-37A's to the Air Force was made in January. Four of the trainers were flown to Connally AFB at Waco and the fifth to Eglin Field, Florida. Major Ray W. Rogers, project officer for the FLYTAF evaluation, ferried one of the T-37A's to Waco, covering the 420-mile distance in 1 hr. 16 mins. to average 335 mph. ground speed for the trip. Describing his cross-country

(Continued on page 40)

Front and rear views of the first Air Force light jet trainer emphasize wide cabin for side-by-side seating of instructor and student. In front view, note height of seats and visibility over the nose, wide 14-ft. tread of landing gear. The T-37A has 33.8-ft. span, 29.3-ft. length, 9.35-ft. height, 4,400-lb. zero-fuel weight and 6,400-lb. gross weight.
—(Air Force and Cessna Photos.)



New 1957 Bonanza, Twin-Bonanza and Super 18 demonstrators were displayed by J. R. Gray Company in open house reception marking the opening of its enlarged facilities. New D50 was delivered to W. W. Walter of Associated Aviation Underwriters, shown at right.

—(FLIGHT MAGAZINE Photos by Tom W. Collins.)

Growing with Beech

New facilities include one of the world's largest inventories of Beech factory parts and approved accessories. In this photo Jim Simmons, company vice president, is shown at one of the large parts order counters.

—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

RANKED by annual sales among the top 5 Beechcraft distributors throughout the world every year since it was organized six years ago, J. R. Gray Company and its Gray Aircraft Service completed expanded facilities last month at its Love Field base in Dallas.

Gray has averaged over 40 airplane sales a year since its beginning in 1950, plowing back profits and adding to investments on a scale which has lifted it from a modest venture into a bulging $2,000,000 facility today, handling more than $3,500,000 worth of business annually.

Its new expansion provides over 37,000 sq. ft. of hangar-shop space plus 49 individual storage hangars, 18 of which are for Twin Beechcrafts and the remainder for Bonanzas. Its staff includes 36 full-time employes and its facilities for complete one-stop Beech service include elaborately-equipped airframe, engine, upholstering, radio, electronics, painting and custom modification shops plus one of the largest Beech parts inventories in the world.

J. R. (Jim) Gray heads the opera-

Custom interior and upholstering work and the firm's new pilots' lounge are shown at right. The lounge is in a new building, separate from sales and service departments.
—(FLIGHT MAGAZINE Photos.)

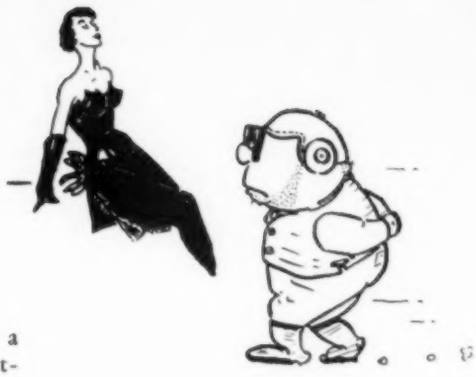
tion as president. D. A. Cody is secretary-treasurer, service manager and partner, and Jim Simmons, Jr., is vice president and partner. Gray began his aircraft sales career in 1945 after serving as a Lockheed and North American test pilot, flight instructor and CAA inspector during the war, having barnstormed after learning to fly in 1927. Cody has specialized in Beechcraft servicing more than 20 years and had been with the Beech factory 13 years before joining with Gray to put his shop over the top from the start as a widely-known Beechcraft expert. Simmons has long used private aircraft in his business operations.

To expand its facilities, the firm constructed a new 18,755-sq. ft. hangar located between its old hangar and its sales and office building, and added new space to its shop hangar. A large new pilots' lounge was constructed in a separate building, completely removed from service and sales departments.

Factory displays at open house included Wilcox and Lear radio exhibits at right, with Jay Wilcox showing Jim Gray the new miniaturized Wilcox dualized package and rack for Super 18's while Orin (Moose) Redhead of Lear shows the new Lear products at his booth. Below is one of the new restrooms and at right is colorful Service Manager D. A. Cody (hat) in his new office. Hook Gaston of the Beech factory is at left.
—(FLIGHT MAGAZINE Photos.)

Power Curves

Engines can be beautiful



By BOB MacGREGOR

A CURVE is the loveliest distance between two points. It may also be used, albeit not so interestingly, to show engine power variation with manifold pressure, as in Figure 1.

Why go to the trouble of discussing this? Well, for one thing, with controllable pitch props, there are two variables which can be jockied to produce a given power output. These are the manifold pressure controlled by the throttle and rpm. controlled by prop pitch. Some combinations are better than others, particularly as concerns fuel economy. Since the engines operate on a Cash-on-Delivery basis, and won't get you to the next field on promises, the time might come when three more miles out of that 32-gallon tank could save the day.

Years ago, the pilot controlled the power situation with a throttle and ignition switch. The position of the throttle lever in its quadrant was the variable. Somebody, desiring to be a bit more precise in selecting the throttle position, added a tachometer. This complexity meant that the pilot positioned the throttle in the quadrant to obtain a certain rpm., a system still used with great success in J-3 Cubs, and such like.

The system had certain merit. In the Jenny, for example, a properly tuned OX-5 with the right prop might cruise at 1,200 rpm. Under instrument conditions, the tachometer became a rate-of-climb indicator, since with a constant throttle setting, the increasing or decreasing rpm. told of dives and climbs. A healthy OX-5 at a full-bore, sea-level take-off, might put out 1,400 rpm. One pilot told of attempting a take-off with a ponderous passenger and a sickly OX-5. After the first mile of take-off run, he was dubious of becoming airborne; finding himself still on the ground after what seemed like two miles, it was apparent that a different course of action was necessary.

The choices in the above case were, perhaps, a valve grind to recover a couple of hundred rpm. from the grave, or substituting a lower-pitch prop permitting a little more wind-up with attendant higher power. The pilot chose the former, but this business of decreasing prop pitch for take-off was in store for pilots.

In the early thirties, the two-position propeller, controllable from the cockpit, was beginning to appear on aircraft. This item merely added one line on the take-off checklist, but along with these two-position props came the more general use of supercharged engines with the necessity of a manifold pressure indicator in the cockpit. Right on top of this complexity came the constant-speed prop.

For a long time it was only the larger aircraft, such as the military and airliners, which presented the complexity of the two variable in power selection, but now it is something every pilot should know about. The Bonanza, the Cessna 180, the Aero Commander and several others in the private plane bracket make use of constant-speed, or controllable-blade-angle props. In addition, aircraft with the Koppers Aeromatic prop perform most effectively with studied use of tachometer and manifold pressure gauge.

Enough talk — back to the curves. We are indebted to Continental Motors Corporation for Figure 1, which represents the output of their E-225 engine under standard sea-level conditions, which are 29.92 inches of barometric pressure and 59 degrees F. air temperature. The curves in Figure 1 are obtained by operating the engine with a brake, or perhaps an electrical load, applied to the prop shaft. Curves show bhp. output versus manifold pressure for five rpm. selections. This selected rpm. is held constant by adjusting the brake, or load, while the throttle is varied to give the manifold pressure. For right now, we can best

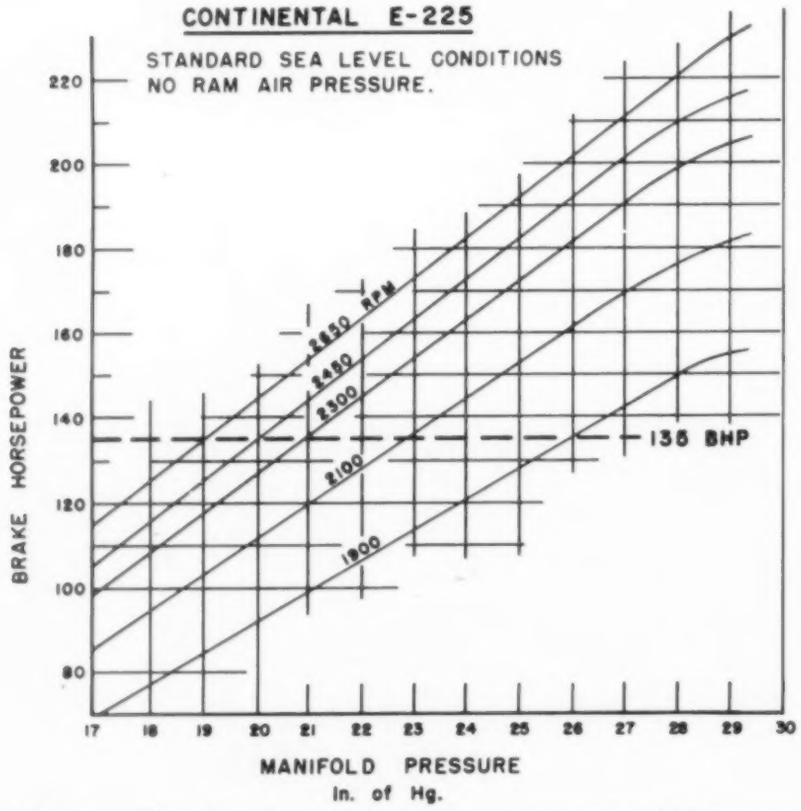


FIGURE 1 — This chart shows brake horsepower versus manifold pressure for five different rpm. settings at standard sea level conditions.

illustrate the point by assuming the engine to be operating under sea-level conditions.

Note that Figure 1 shows 5 specific power settings, each of which will deliver 135 brake horsepower to the prop. Let's not stop to define "brake horsepower" here; its abbreviation is bhp., and it is the actual power available at the prop shaft. The manufacturer's recommended maximum cruising power is 154, which is 68½% of the maximum continuous horsepower rating, and it might be added that this percentage figure is the one generally accepted by the industry as the maximum cruise power rating. The 135 bhp. chosen in the example is 60 *percent* of max continuous, so it is in the useful part of the cruising power ball park.

Now then, under standard sea-level conditions, we have 135 bhp. available with 2,650 rpm. at 19 inches manifold pressure, or with four other combinations down to 1,900 at 26 ins. mp. Which should we use? Why not 2,100 rpm. at 23 ins. mp.? We have two variables — how is the selection to be made? To arrive at a solution, the following must be considered:

a. Is the engine-propeller combination placarded against continuous operation in the speed range under consideration?

b. Is fuel economy of importance?

c. Will low speed operation exceed the allowable bmep. for the 80 octane fuel specified for the E-225?

d. Would high rpm. be balanced by enough manifold pressure to hold down high inertia loads?

Let us settle item (a) by saying that there is no restriction on the 1,900 to 2,650-rpm. speed range. For item (b) let us say that we are in a squeeze, and do wish to conserve fuel, just for laughs. Therefore, we want to operate at the lower rpm. Item (c) will require an explanation.

Bmep means brake mean effective pressure, and such a quantity serves its greatest usefulness in helping to solve power setting problems. This item is a theoretical pressure which is considered to be pushing on the engine pistons to produce the brake horsepower put out by the engine. Power is a rate of doing work, and work is an effort over a certain distance.

$$bhp = \frac{bmep \times A \times L \times N}{33{,}000}$$

Where: A = piston area in square inches
L = length of stroke in feet
N = number of power strokes per minute
33,000 = rate at which one horse can do work

Since this is no math class, and horsepower formulas can be found in a high school physics book, we will just boil the expression down to:

$$bhp = \frac{bmep \times displacement \times rpm}{792{,}000}$$

OR:

$$bmep = \frac{bhp \times 792{,}000}{displacement\ (in\ cu.\ in.) \times rpm}$$

For max cont. power:
bmep = 142 lb/in² for the Continental E-225
For max cruise power:
bmep = 112 lb/in² for the Continental E-225

Now then, let's fix the bmep at 112 lb/in², and with the bhp at 135, what does the formula give us for rpm?

$$rpm = \frac{135 \times 792{,}000}{112 \times 471} = 2{,}000\ rpm$$

With a bit of interpolation from Figure 1, we find at standard sea-level conditions the specified horsepower can be obtained with 2,000 rpm and just a hair over 24 ins. mp.

Actually, to get the most useful work out of the fuel, we should operate with the lowest possible friction loss in the engine, and this means using the lowest possible rpm. Therefore, if the bind was tight, rather than sit there and sweat out a fuel gauge, I'd drop the rpm on down to 1,900 and use 26 ins. mp. That is, if I wanted to maintain that 135 bhp. A glance at the specific fuel consumption curves for the engine substantiate the rpm selected as being that for economy.

Before shutting down, we had better talk a bit about the limits of the two variables just discussed. It was shown that bhp could be held constant if the rpm were increased while the manifold pressure were decreased, and vice versa. How far can we go, one way or the other, and what happens?

High rpm at low manifold pressure can be rough on an engine. One reason the friction loss increases with rpm is the tremendously increased inertia loads on connecting rod and piston pin bearings. A case in point was a friend with his newly acquired Model T Ford, a number of years ago. Near his home was "one-mile-hill," a natural for saving fuel by coasting down with throttle closed. The hill was steep and the Model T was really revving up. By the time he reached the bottom of the hill, our friend had four hammers working down in the engine room, the connecting rod bearings having disintegrated. There were contributing factors, of course: The Model T oiling system was not an "all attitude" design; and the cast iron piston construction did not have light weight in mind. There is a bit of a moral to this story, since there are many opportunities to "coast down hill" in an airplane.

To illustrate what a killer this high rpm-low throttle operation can be, a formula from Mark's Mechanical Engineers' Handbook gives us the load imposed on the crank shaft bearing when accelerating the piston from top dead center — 2,040 lbs. at 2,000 rpm. Amazing, maybe, but it's a fact — a one-ton load on the bearing unless counterbalanced by some manifold pressure. If the rpm goes up to 2,500, this force is multiplied by 1.69, over two-thirds again as much. This is for an engine similar to the Lycoming O-235.

On the other hand, too much manifold pressure can raise cain with the power plant. It can cause detonation, and ruin a piston, as shown in Figure 2. The subject piston was ruined by

(Continued on page 60)

FIG. 2 — Detonation from single-ignition operation damaged piston at left.

Now — You *Fly* Through

More POWER
More SPEED
More COMFORT
More BEAUTY
More SAFETY

Here is the twin-engine airplane that provides *everything* — from the most visibility to easier entrance and exit. Like ultra-modern airliners, the new Twin-Bonanza has low-wing design safety — and passengers are far behind whirling propellers.

Supercharged engines provide *speed to spare.* And there's no ducking, stooping or stretching when entering or leaving the Twin-Bonanza.

The quiet, luxurious comfort of this outstanding airplane can only be fully appreciated in a demonstration ride. Contact your Beechcraft distributor or dealer who represents the world's finest aviation service organization — he will be happy to oblige.

The BEECHCRAFT Twin-Bonanza
Flying 6 persons as far as 1,650 miles
at speeds up to 240 miles-per-hour.

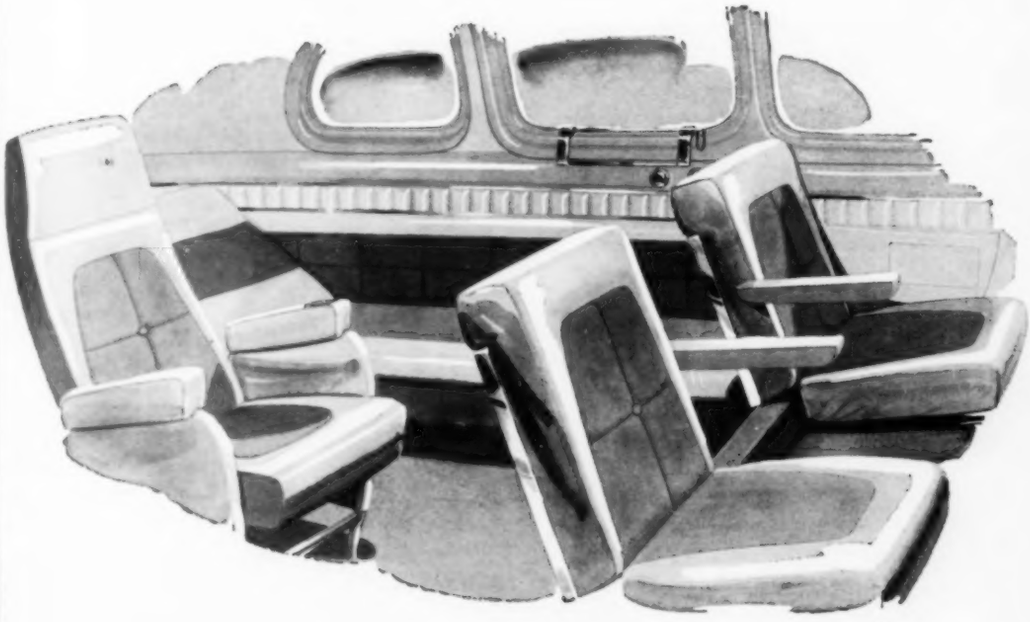
h the Air at 240 Miles Per Hour!

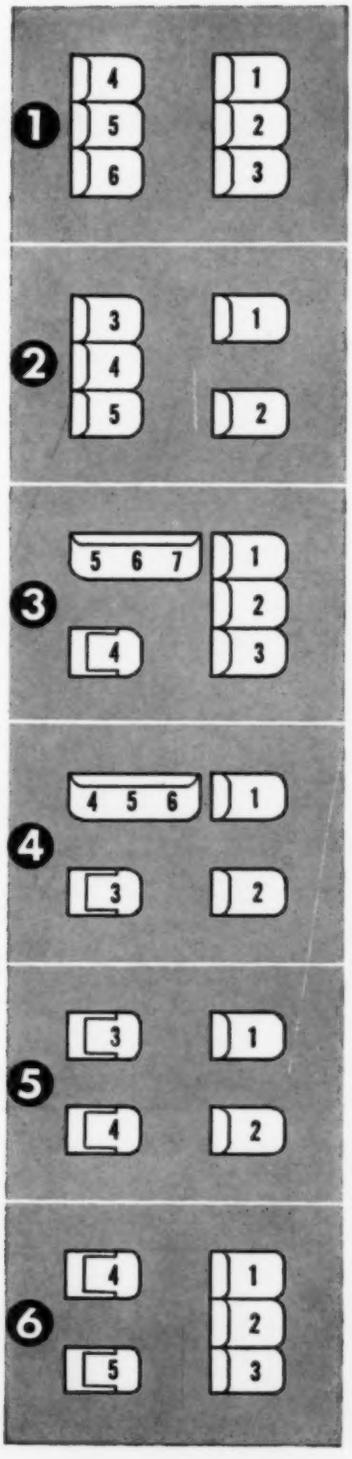
IN THE *New*, BIG, BEAUTIFUL BEECHCRAFT TWIN-BONANZA

New speed, new power, new luxury — and *six* different interior seating arrangements — are yours in the brilliant *new* Beechcraft Twin-Bonanza for 1957!

Here's the luxury and comfort of your own living room — styled to the ultimate in taste and decor — with unequalled stretch-out room for every passenger!

Note the six illustrated seating arrangements on the right — then see your Beechcraft distributor or dealer for the *finest* planes in the skies, and the most *comfortable* finance plans in aviation!

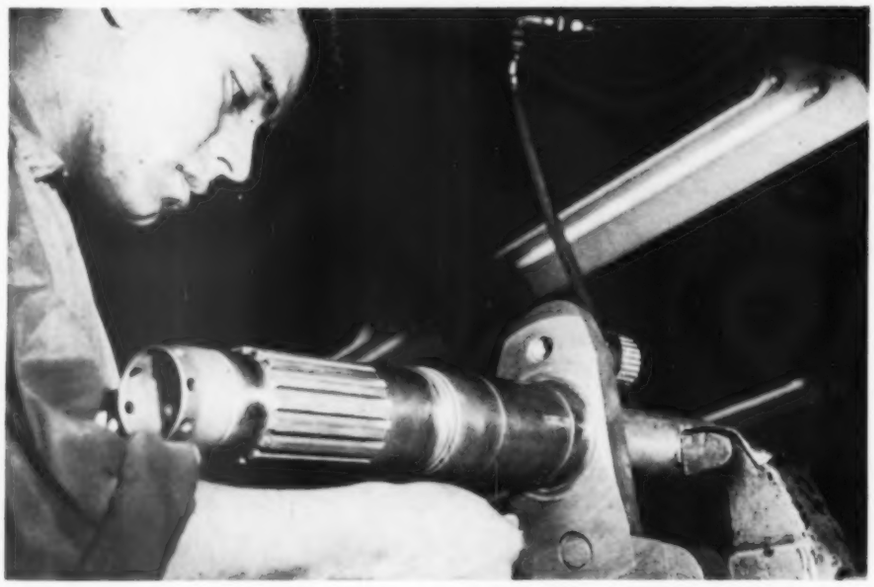




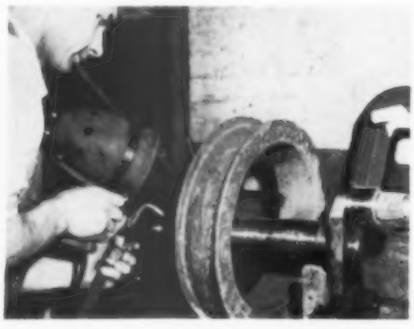
Beechcraft

BEECH AIRCRAFT CORPORATION
WICHITA, KANSAS, U. S. A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



Emery cord is used to relieve the radius of thrust nut thread-roots.



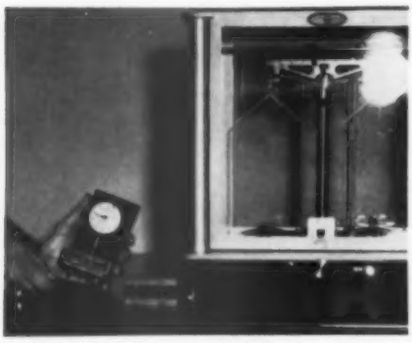
Magnafluxing starts crankshaft process.

Crankshaft Rework

HUNDREDS of business planes and military aircraft are affected by bulletins requiring rework and inspection of crankshafts on Pratt & Whitney R-985 and Wasp, Jr. engines to avoid crankshaft cracking at the thrust nut threads and possible loss of the propeller in flight. To illustrate the tedious process involved, the pictures on this page were made by a Southwest Airmotive photographer in his shop, one of the few factory-equipped to meet the exacting requirements involved.

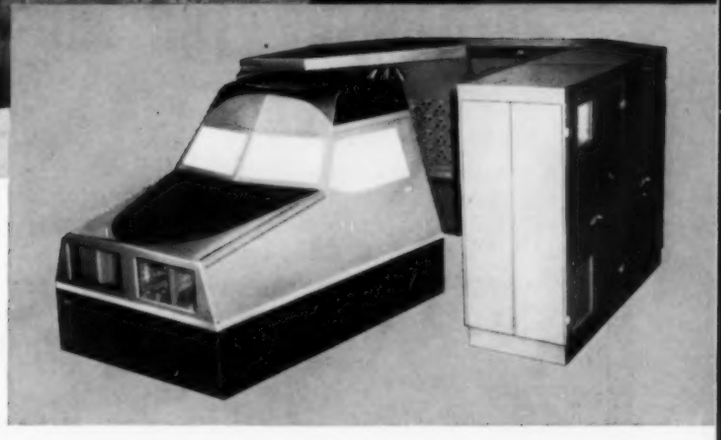
After Magnafluxing (crankshafts with cracks must be replaced), an emery cord is used to relieve the radius of thrust nut thread-roots, each of four threads being reworked in 60-deg. sections with removal limited to .0025 minimum and .0035 maximum. A shadowgraph machine magnifies the threads 20 times for scientific verification of the tolerances, and the threads are then carefully grit-peened. This requires jeweler-like control and calibration of the grit-peening blast, which is tested by an Almen strip after the rework of every fifth crankshaft. The strip is not only measured in a sensitive gauge but is weighed in milligrams to calibrate the blast's precision effects.

Grit-peening with calibrated blast.



Gauge (left) and scales test peening.

Shadowgraph projects 20-time enlargement on screen for verification of thread-root rework tolerances limited to .0025 minimum and .0035 maximum.



LINK'S E-600...

selected by Flight Safety, Inc. to train corporate aircraft pilots

Link's E-600, America's first commercial twin-engine ground trainer, is being used daily by Flight Safety, Inc., at New York's LaGuardia to improve proficiency of flight crews of the nation's busy corporation aircraft.

More than one hundred aircraft operators in business and industry are charter subscribers to a new cooperative use program under which pilots and co-pilots regularly practice complex flight and navigational procedures on the E-600.

The E-600 provides the most complete radio aids simulation for realistic drills . . . enables pilots to receive up to four stations simultaneously . . . permits instructors to reproduce engine failures, fires, instrument malfunctions and other emergencies. The ultra modern DC flight computing system is the first ever used in a production electronic flight trainer for the training of commercial pilots.

Link's E-600 is ideal for training crews of all existing twin-engine aircraft used by corporations—without costly operation of actual aircraft.

Pioneer and World's Leading Producer of Flight Simulators

LINK AVIATION, INC.

A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

BINGHAMTON, NEW YORK

GPE

Among the 25 individuals representing airlines having Fairchild propjet F-27's on order at the New York meeting last month were, left to right, Benoit Ste. Marie, Quebecair, Inc., Rimouski, Canada; William J. Mitchell, Bonanza Air Lines; R. James Pfeiffer, chairman of the meeting for Fairchild; W. G. McGee, Piedmont Airlines; Raymond I. Peterson, Northern Consolidated Airlines, Anchorage, Alaska; and Tom Croson, West Coast Airlines.

"Friendship" buyers look ahead to—

Bringing The Jet Age To Main Street

A UNIQUE cooperative promotional program supporting the introduction of the Fairchild F-27 propjet transport into North and South American airline operations was launched last month during a two-day meeting between purchasers of the F-27 and Fairchild officials.

The program was developed to provide identification of the Fairchild "Friendship" with all areas in the United States, Canada and Latin America where it will be operating in less than 24 months. Travelers transferring from trunk airline systems will be pre-conditioned to the fact that F-27 service will be available on one segment of the interline trip.

The conference was conducted by R. James Pfeiffer, executive director of Fairchild customer relations; William G. Key, assistant to the president of Fairchild; and Paul Gaynor, president of Gaynor Colman Prentis & Varley, Inc., Fairchild's ad agency.

During the meeting, Pfeiffer announced that backlog orders for the F-27 had reached 60 airplanes at a value of approximately $33 million. Eight of these orders are for corporate executive use. The first production airplane is scheduled to roll off the assembly line in the late fall of this year. Operational use by U. S. local service airlines is scheduled for early 1958.

U. S. carriers with firm orders on file include Mackey Airlines, West Coast Airlines, Frontier Airlines, Bonanza Air Lines and Piedmont Airlines. In Alaska, Northern Consolidated Airlines; in Canada, Quebecair, Inc., and in Ecuador, Aerovias Ecuatorianas. The Northern Consolidated F-27's will incorporate a movable forward bulkhead to permit a wide variety of freight and passenger loading combinations. Loads can vary from the standard 40-passenger, plus normal baggage condition to an all-freight payload, according to the needs of the operator. In addition to the movable bulkhead, the Alaskan airplanes will have a large forward cargo door measuring 77 by 84 inches. Simultaneous loading of passenger and freight compartments will be possible.

Powered by two Rolls-Royce Dart engines, the F-27 has a range of 2,250 miles and boasts a take-off capability of 3,800 feet at maximum gross load.

An impressive series of advertisements in color has already been launched as the first step in the promotional campaign.

This campaign will be backed up by promotional materials including counter cards, luggage stickers, playing cards, match books, post cards, shoulder patches, tie pins, lapel pins, ash trays, cigarette lighters, postage meter stamps, F-27 color art for framing, cut-outs, Fairchild signatures and logotypes, mats and material for individual carrier advertising, photos, television and 35 mm. slides of the Friendship. Two illustrated booklets in color will also be available. One, entitled "Welcome to the Panoramic Propjetliner," will be placed aboard the F-27's and will explain in layman's language such outstanding features as quiet, vibration-less propjet power, the comfort of pressurization and air conditioning, the 280-mph. speed, visibility advantages of the high wing and the ability to operate from relatively small airports.

The other booklet, "The Case for the DC-3 Replacement", tells the story of the advancing obsolescence of the reliable old workhorse and of the development of the F-27 as a successor.

Oklahoma Applicator Praises PIPER PA-18-A

Aero Sprayers, Inc., Kingfisher, Oklahoma, Have Used Pipers Exclusively for 7 Years..."More Efficient...More Economical"

Irvin K. Bollenbach,
President,
Aero Sprayers, Incorporated

"We have used Pipers as sprayers for over eight years," says Irvin K. Bollenbach. "Our first sprayer was a surplus J-3 with a 65 hp engine. Then we used PA-11's with 85 and 90 hp engines. We thought these were really the 'hot stuff!' Since our first PA-18-A, in 1951, we have used them exclusively. From spraying lakes to kill rough fish, to seeding pasture land, to defoliating alfalfa and cotton, they have always proven tops in performance.

"During the greenbug 'epidemic' in 1952 we called in other applicators to help us. Our 18's sprayed in the same fields with their Stearmans, and because of better visibility the 18's could do a more efficient and uniform job and also spray more acres in a given time. They are much more economical to operate than Stearmans.

"We have yet to overhaul one of the Lycoming engines and even after 800 hours (and these are hard hours) they are operating very well. Another point I like about the PA-18-A is its versatility...from sprayer to duster in minimum time. Its fast take-off and high rate of climb make it invaluable for operating out of the short fields which we must use most of the time. Another asset to consider is the high resale value of these sprayers."

Fleet of three 150 hp Piper PA-18-A sprayers currently operated by Aero Sprayers, Inc.

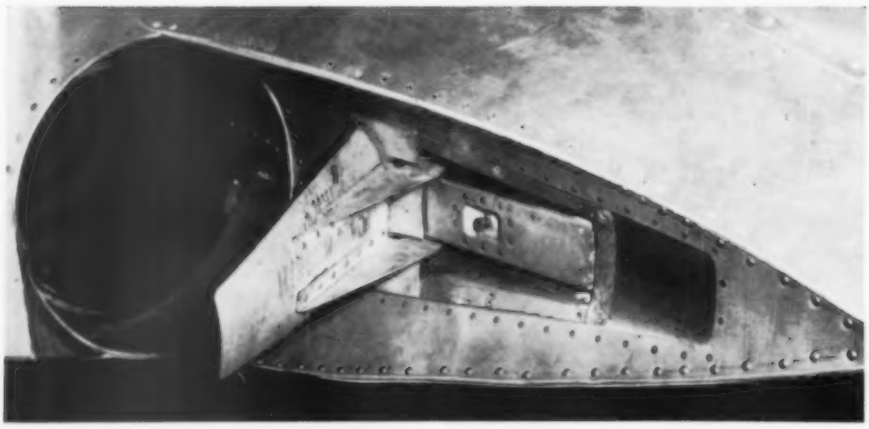
THE PA-18-A WILL MAKE MORE MONEY FOR YOU, TOO

More PA-18-A agricultural planes are produced than any other duster or sprayer in the world for a very good reason. They do the job better at less cost. Send for full details on the latest 1957 Piper PA-18-A duster, sprayer and combination models and see why this airplane will make more money for you, too.

PIPER

AIRCRAFT CORPORATION
LOCK HAVEN, PA.

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD



Symbolic of the oft-discussed thrust reversers for future jet airliners, the retractable exhaust deflector above is one of two thrust attenuators on the T-37A. With the throttle at 60% rpm., they reduce effective thrust by 40% in approach and landing. In photo at left, shelf-like strip along side of nose is an aerodynamic "fence" for improved flow at high angles of attack.

—(Cessna Photos.)

CESSNA T-37A

(Continued from page 29)

hop to FLIGHT MAGAZINE, Major Rogers said:

"At 6,400-lb. gross, I was off the ground at Wichita in 1,500 ft. and climbed to 20,000 ft. in 11 mins. Cruise power of 92% rpm. gave me a cruising speed of 220 knots IAS at 20,000 ft. for a true air speed of 310 knots or 355 mph. At this power and speed, fuel consumption was 160 gals. per hour. I used 60 gals. in the climb to 20,000 ft."

The T-37A, powered by two small Continental J-69-T-9 centrifugal jet engines rated at 920 lbs. of thrust each, has 309-gal. fuel capacity for optimum range of about 700 miles plus a 30-min. reserve, or for about 20 take-offs and full-stop landings in local training.

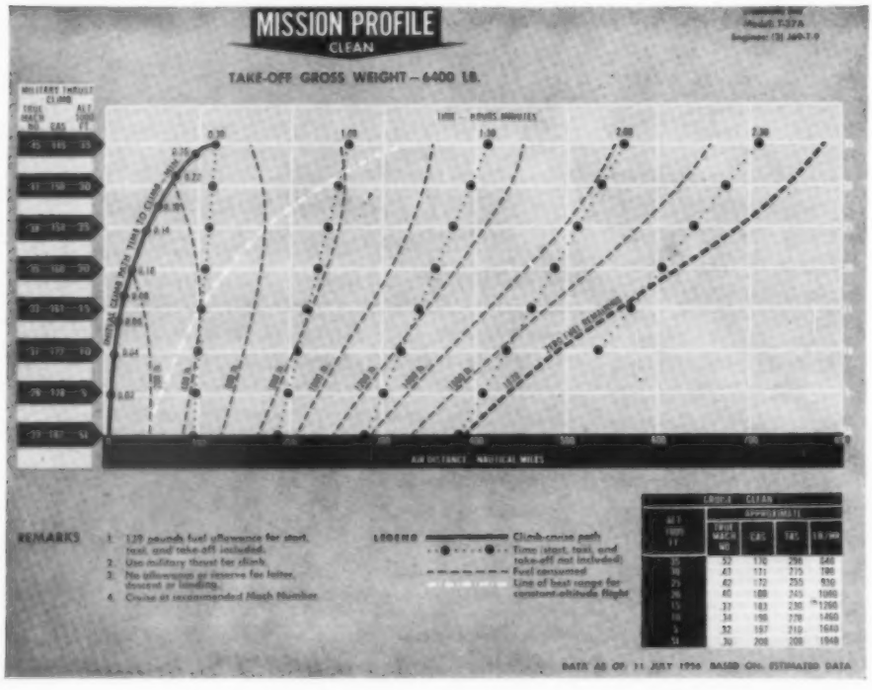
The elaborately-equipped trainer incorporates such features as retractable attenuators (thrust reducers in the exhaust stream); eyebrow spoilers on each engine nacelle for stall warning with flaps down at low speed in the landing configuration; speed brake located behind nosewheel; powered canopy; ejection seats and complete dualization of instruments and controls in fighter-type but side-by-side cockpits. With elaborate instrumentation and radio gear for communications and navigation, it resembles an advanced trainer and is equipped for cross-country, night and partial weather flying, lacking only de-icing equipment for all-weather operations.

"The T-37 handles very nicely, responds quickly to controls, is above average in acrobatics," Major Rogers said.

The T-37A at a 6,400-lb. gross has a 4,400-lb. zero fuel weight. Span is 33.8 ft., length 29.3 ft., height 9.35 ft., wheel base 7.75 ft., and tread 14 ft. Diving limit speeds are 382 knots (490 mph.) below 10,000 ft. and Mach .7 above 10,000 ft., with 5G positive and 2G negative maximum load limits and 150-knot gear extension and 135-knot flap extension limit speeds. Power-off stall speeds at gross weight are 72 knots (83 mph.) for landing with flaps and 86 knots (98 mph.) clean, being 4 knots less with power on. Minimum safe single-engine indicated air speed is given as 100 knots (116 mph.). Performance charts indicate 40,000 ft. as the ceiling, with single-engine service ceilings of about 8,000 ft. at 6,400-lb. gross and 12,500 ft. at 5,400-lb. gross using normal 92% rpm. thrust, and 14,000 ft. at 6,400-lb. gross and 19,000 ft. at 5,400-lb. gross using military thrust at 97% rpm. The T-37A is unpressurized but is equipped with oxygen.

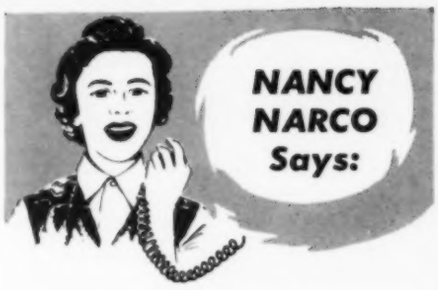
Cruising speed at recommended thrust of 92% rpm. places the T-37A in the 350-mph. performance category, with cruising fuel consumption averaging about 160 gals. per hour at 20,000-ft. altitude. About 21 gals. are used for start, taxi and take-off and about the same amount for rapid descent and landing.

Take-offs and landings at gross weight and sea level within less than 2,500 ft. are a feature of the T-37A for student training.



Profile charts such as this are among elaborately-prepared data for student flight-planning with the T-37A. This mission profile chart is a worksheet on which a student enters his trip requirements in distance, time, fuel, speed and altitude to meet the widely-varying factors inherent in jet operations. "CAS" on the chart is for calibrated air speed, which is indicated air speed corrected for installation error.

—(Cessna Chart.)



HAVE YOU EVER been in one of the big league control towers when the weather was real low-down and dismal? I have. It's really something to listen to the cool pros at both ends of the party line. The chips are down when the stuff is 200 feet up and less than a mile away, but those controllers just tighten down and pass a miracle about every minute.

EVEN A CONGRESSMAN's clerk knows that tower controllers have a large chore on their hands these days, but how many know how much easier a pilot can make the controller's job? Or how tough a bewildered "stranger" can make it for them?

IT'S ALL a matter of radio — having the right radio to do the job at hand and knowing how to use the radio you've got. The folks at Narco are letting me use this space to talk about using your aircraft radio. But before we even leave the gate, please understand that I don't know a microvolt from a stove bolt. Don't care to, either — those engineers in the backroom look a little wild. I'll do my listening and learning in cockpits and control towers.

IN THIS OPENING column I'd like to touch on a few random points . . . like radio pattern shadows. Some of the large airports have patches on their acreage where tower signals just fade out. Chicago Midway and LaGuardia both have their weak spots. Some other airports are the same way. If your call isn't getting through or you don't hear the man answer, move a little, or turn the airplane so there's a clear path between your antenna and the tower. And of course if there's a Connie between you and the tower you'll probably be blocked out in more ways than one.

YOU CAN also get blocked out simply by too much traffic on the same channel when approaching a busy terminal on one of those "peak VFR" days. Best procedure is to work out your initial call in your mind before you mash down the mike button. Never mind the "call-up and reply" gingerbread — make it fast and complete on the first call. "Washington Tower, Beech 274, Friendship, VFR, over." Chances are this gets you on the list in the tower as a guy who knows what he's doing. And if there's a straight-in approach to be dealt out you're going to get the best possible break.

BEEN NICE chatting with you. Bet you've got two cents worth to contribute, too — you airplane drivers and tower constables. Here's your chance to sound off about radio usage, communications, navigation, the works. Just write me a note.

Nancy

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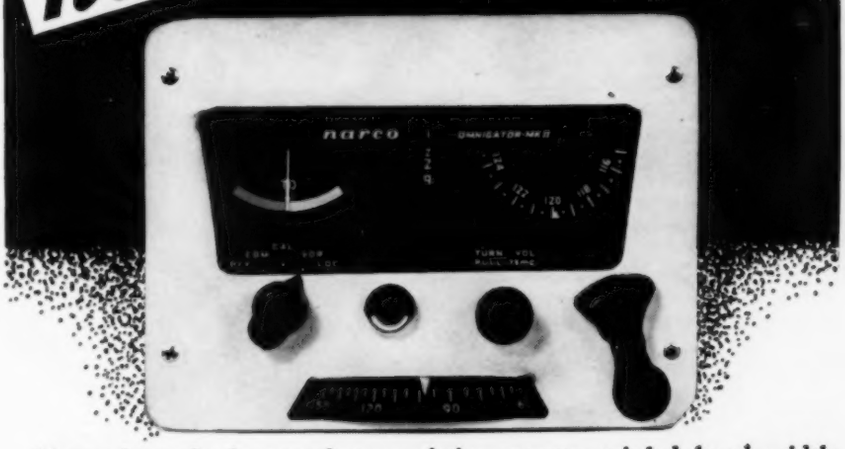

More channels, increased transmitting power, tripled band width, whistle-stop tuning, increased speaker output—all these up-to-date features plus many others are offered in the sensational new Omnigator Mark II. Printed circuits plus the most advanced electronic refinements make all this added performance possible in the same compact single-package navigation and communications unit which has made the Omnigator the most popular, the most respected, the most accurate (proved by government test) of all popular business-plane Omnis.

NOW

with 27 Channels

NO OTHER RADIO GIVES YOU SO MUCH IN A SINGLE, COMPACT UNIT

27 CHANNELS give you ample crystal capacity for all normal communications — VFR or IFR.

TRANSMITTER POWER INCREASED; BAND WIDTH TRIPLED.

DOUBLED AUDIO OUTPUT.

SUPER ACCURATE VOR navigation. Factory-certified to be accurate within 2 degrees.

LARGE SCALE COURSE SELECTOR permits accurate course selection to the exact degree.

IMPROVED COURSE INDICATOR with ideal sensitivity, combined with new type To-From indicator.

ILS LOCALIZER reception for instrument approaches.

75 Mc MARKER BEACON RECEIVER.

VHF RECEIVER 108 to 127 mc for crystal clear reception.

Plus

BUILT-IN WHISTLE-STOP TUNING!

Pioneered by Narco four years ago, tunes your receiver precisely, positively to your transmitter frequency for simplex communications with towers, control centers, Unicom.

See your Narco dealer or write for new brochure.

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and Clover Field Airport
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Highland Park Airport and Love Field
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Dixie Air Associates, Inc.
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Executive Aircraft Company
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Ragsdale Flying Service
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Austin, Texas

Kenneth Starnes Aviation Service
Adams Field; Little Rock, Arkansas

Southwestern Skyways, Inc.
Municipal Airport
Santa Fe, New Mexico
and Ogden, Utah

Sunny South Aircraft Service, Inc.
Broward International Airport
Fort Lauderdale, Florida

Walston Aviation, Inc.
Civic Memorial Airport
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WestAir, Inc.
Municipal Airport
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HERE'S to the top man in business flying — long may he rule! Only by keeping him satisfied do we stay at the top with our Authorized Cessna Service Stations — in aviation as in any business, the one who progresses most is the one who gives his fellow men a little more . . . a little better service — LIKE OUR FAMOUS 1-2-3 CESSNA FLAT-RATE SERVICE!

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2 You get genuine Cessna parts and factory-trained workmanship.

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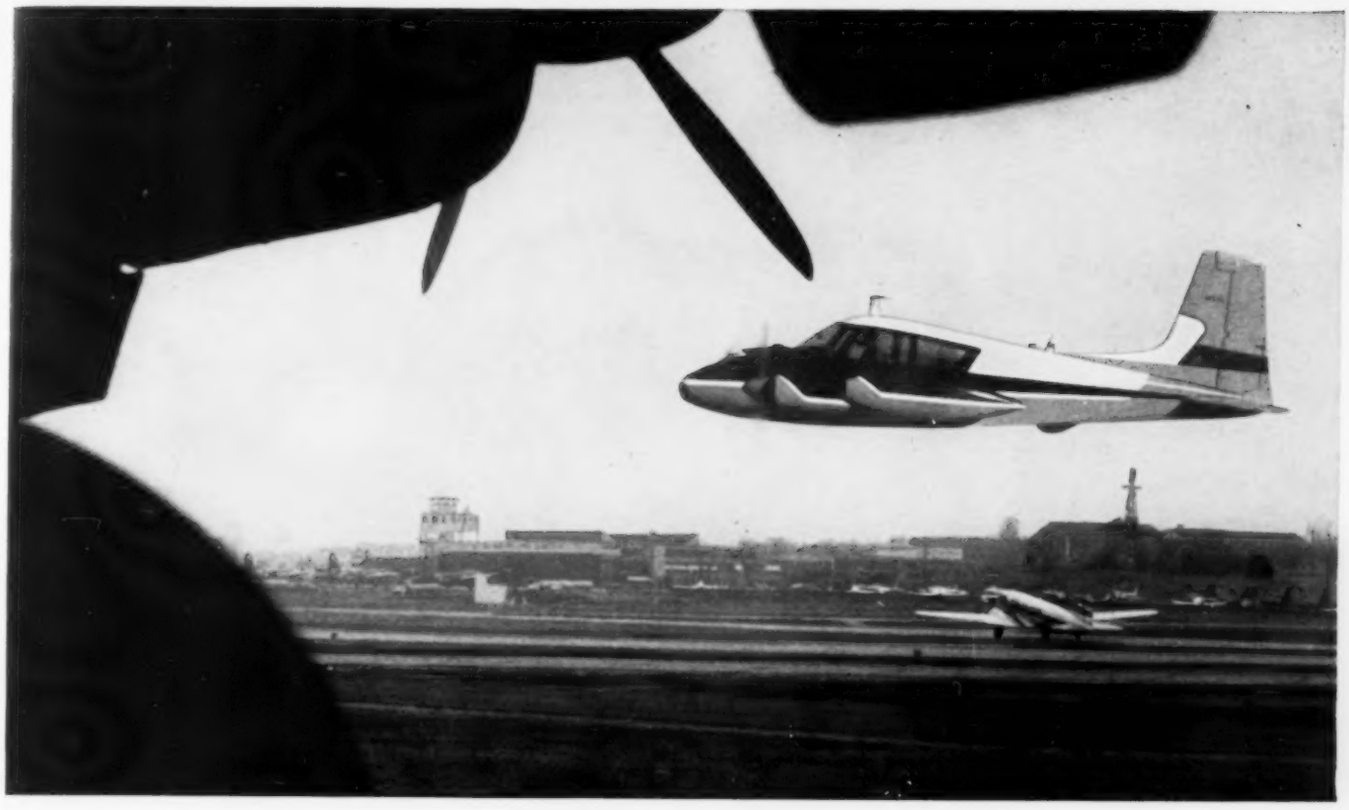
Tomorrow's Business Twin Today—the luxurious 5-place Cessna 310



Business fleets get new flexibility, speed, economy with Cessna twins— 3 for the price of 1 converted transport

Pilots who have added Cessna 310s say:

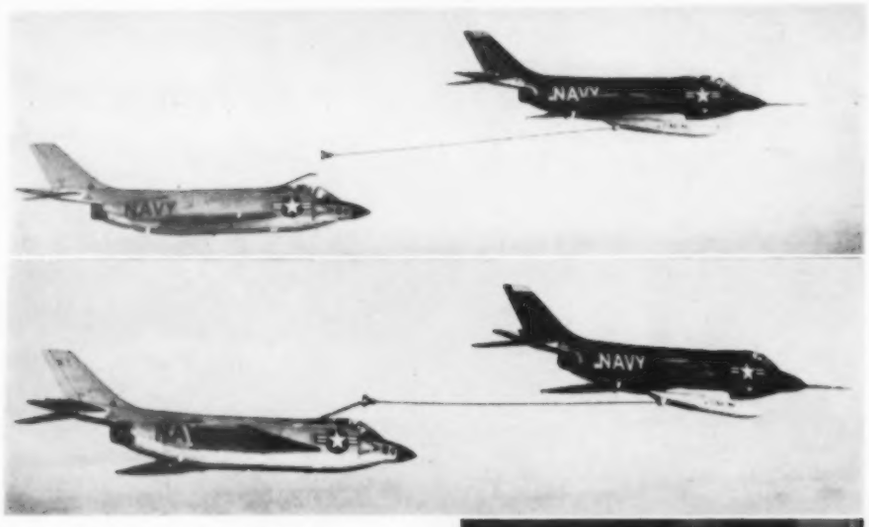
Ray Mabe, Oman Construction Co.: "The Cessna 310 is showing itself to be the 'in-between' ship we were looking for—spreads out our fleet by getting into fields where bigger planes can't go: in fact, lands and takes off shorter than many single-engine makes, yet has more power per pound of weight than any other business twin."

Jack Ollom, The J. R. Watkins Co.: "It's a fun trip whenever I take the 310 up. It's the fastest, most dependable new twin I've seen. And that luxury cabin makes some of our execs prefer it for all trips. We flew our 310, 125 days out of 168 work days, accumulating 97,211 passenger miles with 96% on-time arrivals during the last 8 months—at a very low cost per mile."

Richard W. Smith, Champion Paper and Fibre Co.: "I've always liked big transports. At the same time we need smaller planes for flights with fewer passengers. We bought our first 310 and found it suited our needs—as a result we now have a second one. 310s add flexibility to our fleet and their cost per passenger mile encourages their use." SEE YOUR CESSNA DEALER (Yellow Pages of phone book) or write CESSNA AIRCRAFT CO., DEPT. FM-4, Wichita, Kansas.

Cessna *Inquire about Cessna Lease Plans*

4 GREAT CESSNAS 172 180 182 310 THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED



DIVERSIFIED RESEARCH programs at Beech Aircraft include in-flight refueling systems for McDonnell F3H-2N Demon Navy fighters (above) and the use of instrumented dummies (right) in high-speed emergency ejections from the Navy's Martin P6M jet Seamaster. In addition Beech has other research projects including development of truck tanks for liquid gases. For in-flight refueling, Beech produces a 22-ft. tank containing fuel, flexible steel hose on a reel and a hydraulic pump system.

HELICOPTER FREIGHT including 2,500-lb. Jeeps and field guns are being carried by a Kaman HOK-1 undergoing evaluation tests by the Army at Fort Rucker, Alabama.

AIR REPORT

(Continued from page 5)

Manager M. F. Mellinger. Sabena will use three of them as cargo and personnel carriers in the Belgian Congo and five of them in Brussels as instrument trainers for Sabena airline pilots. Anselme Vernieuwe, the widely known Sabena operations executive, made the 310 purchase after an evaluation of equipment.

ARMY AVIATION PROCUREMENT FUNDS have been slashed to $82 million in the new budget. Last year's budget gave Army over $100 million. When viewed with Secretary of Defense Wilson's edict of 1956 restricting Army Aviation to arbitrary weight limits the two developments pose a serious blow to Army's mission capabilities in the air. Look for repercussions in Congress inspired by leaders in and friends of Army Aviation.

C. J. (JACK) REESE, president of Continental Motors, is the new chairman of the AIA Utility Airplane Council, succeeding Dwane L. Wallace, president of Cessna Aircraft. He will also serve on the AIA board of governors. The Utility Airplane Council consists of companies producing aircraft and engines for general aviation and business flying.

As of January 15, **CESSNA'S FOUR-ENGINE, PRESSURIZED EXECUTIVE 620** transport logged 160 hours total test time. The 620 program is "on schedule" according to Dwane Wallace, Cessna president.

THE CALIFORNIA AERONAUTICS COMMISSION which has been threatened with dissolution during past couple of years will be strengthened materially if several bills introduced by Senator Teale last month in the state legislature are enacted. The Commission would be changed to a "department" but the director of aeronautics and the five governor-appointed commissioners would be retained. The new legislation includes provisions for a $1 million hangar construction loan fund.

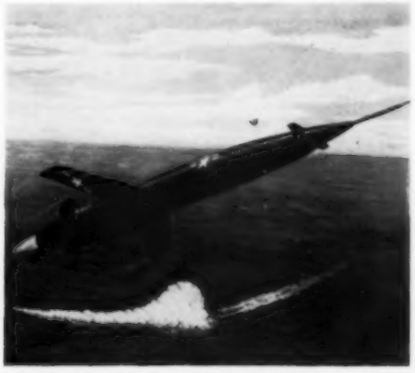
FIRST STUDENT TO COMPLETE NEW AIR FORCE ROTC FLIGHT TRAINING is Billy J. Mitchell of Oklahoma University, passing his private pilot flight test on Jan. 7 after 36 hrs. 20 mins. of flight time in 31 days.

NEARLY $3,000,00 WORTH OF SUPERCHARGED E50 TWIN-BONANZAS have been ordered from Beech by the Army and will be the L-23D.

GERMAN ARMY AND LUFTWAFFE have ordered 26 Vertol 20-passenger H-21C helicopters. . . . **FOUR DE HAVILLAND OTTERS** are operating with United Nations Emergency Forces in Egypt. . . . **SIKORSKY HUS HELICOPTER FOR THE MARINES,** a development of the S-58, made its first flight last month. . . . **HELICOPTER ASSOCIATION OF AMERICA** convention in New York elected Carl Brady of Economy Helicopters, Yakima, president, and Miss Elynor Rudnick of Kern Copters, Bakersfield, secretary.

TEMCO AIRCRAFT CORP. has a new $16,000,000 Navy contract to develop a new guided missile weapons system.

BELL HELICOPTER CORP. has an order for over $3,000,000 for 84 Army H-13H helicopters and parts, an extension of earlier orders for 105 of the Lycoming powered H-13H. . . . **TRAINER VERSION OF 4-PLACE BELL 47J** will be the Navy HTL-7,



NEW SUPERSONIC REGULUS II long-range guided missile for the Navy is being produced by Chance Vought Aircraft. Sketch shows it after launching from a submarine.

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Helihomer for Copter Navigation

Numerous commercial helicopter operators are flight-testing the "Helihomer," a new navigation aid produced by Clover Field Radio Supply of Santa Monica, Calif., after development tests by Hawk Helicopters and Magnolia Petroleum in servicing Texas offshore oil drilling platforms. Using a 460-470-mc. band assigned by the FCC, the 15-lb. receiver installation (shown above) features a meter indicating on-course headings based on shore-based transmissions. The result is precision navigation between shore and platforms at sea and between platforms. "It works perfectly," says Sam Willis of Magnolia, Bud Kelley of Hawk and Vernon McCullough of Clover Field Radio. Airborne installation costs $1,495 and shore station installation costs $1,500. Hawk Helicopters, Meacham Field, Ft. Worth, is sole distributor.

18 of which have been ordered for basic and instrument flight training.

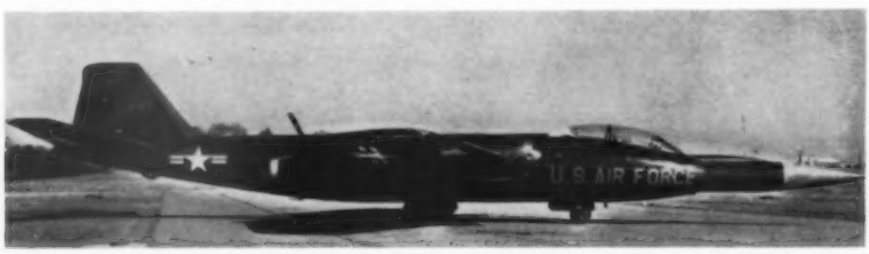
ARGENTINA HAS ORDERED 90 BEECH T-34 TRAINERS worth $4,000,000, 15 being flown from Wichita and the remainder being shipped as components for assembly in the government IAME aircraft plant in Cordoba. They will be gunnery trainers.

LOCKHEED'S 1956 PROPJET AND PISTON TRANSPORT ORDERS totalled 68 aircraft for 19 customers for sales of $175,000,000.

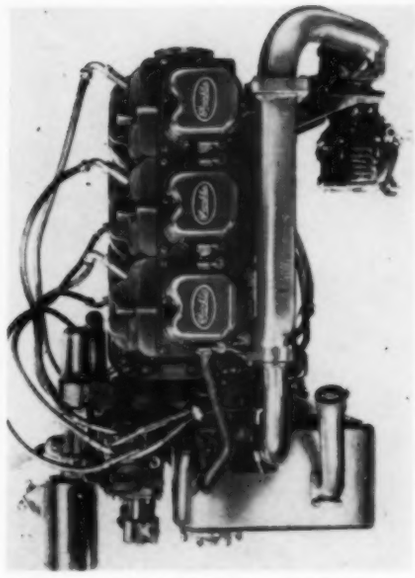
TWO LARGE AIR FORCE CONTRACTS FOR CONVAIR last month included $70,200,000 for F-106A interceptors and $74,000,000 for F-102A interceptors. . . . **FLIGHT REFUELING, INC.**, has a $2,000,000 Douglas Aircraft contract for A3D aerial tanker equipment.

ADDITIONAL KAMAN HOK-1 HELICOPTERS have been ordered by the Navy for rescue and utility operations aboard aircraft carriers. . . . **KELLETT AIRCRAFT CORP.** expects to triple its 1956 volume of $1,200,000 in 1957, and will double its roster of 300 employes within six months.

AIR ACCESSORIES, INC., has opened a new warehouse and branch office in Houston, Texas, at 5828 Harvey Wilson Drive for its Delta



JET BOMBER WITH MISSILE NOSE is used by Boeing as a test bed for Bomarc missile guidance systems. Temco Aircraft modified the B-57, the work including weight and stress design changes, additional hydraulic and electrical systems and ammonia and nitrogen tanks as well as fabricating the 17-ft. nose.



NEW HELICOPTER ENGINE is Aircooled Motors' 6V-335 which develops 210 hp. at 3,100 rpm. at sea level and maintains 200 hp. at 1,500 ft. or at 110 degrees F. for a 12.5% increase in payloads for Bell and Hiller machines. An improved valve gear design is principally responsible for the power increase over the widely-used Franklin 200, which can be modified for the new 210-hp. rating.

Produets Division. . . . **STANDARD PRODUCTS, INC.**, Wichita, with Kansas City and Tulsa branches, has been appointed McCauley propeller distributor.

CAA ADMINISTRATOR JAMES T. PYLE will address the 6th Annual Texas Agricultural Aviation Conference at Texas A & M College on Feb. 25.

AROUND THE WORLD IN 45 HOURS 19 MINUTES is a new record made last month by three Air Force Boeing B-52's refueled in flight to make the 24,325-mile trip non-stop.

MODEL SALES MANAGERS have been named by Leddy Greever, Beech Aircraft sales manager, and are pictured below. Left to right are Hook Gaston, Super 18; Marvin (Silent) Small, Twin-Bonanza, and Steve Howbert, Bonanza. All were promoted to the new positions.

Now...new larger facilities that provide...

one stop service for everything your business airplane needs

We now have more than 100,000 square feet of floor space. Here are the finest equipment and facilities in America for the modification, servicing and testing of business aircraft. They fall in these categories:

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Your airplane is worked on by licensed, thoroughly experienced technicians and craftsmen, with the finest interior stylists and complete engineering service at hand when required. You receive quick and courteous service and can have complete confidence in the results.

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BUSINESS AS USUAL IN A NEW LOCATION ON LOVE FIELD in Dallas is being conducted by Southwest Airmotive, caught in a squeeze between demolition of its last hangar on the old site and completion of its new 35-acre plant across the runway. The hangar shown with 11 acres of new paving is the first section of a 5-unit structure measuring 800 by 160 ft. Starting immediately will be a second hangar and a business flying terminal to the right of the hangar, with completion due in September. Behind the hangar shown is a newly-finished "Plane-O-Tel" measuring 400 ft. by 80 ft. and containing individual aircraft storage units.

Nationwide Roundup:

New Business In The Hangar

This B50 resembles a D50 with its three-bladed props and 275-hp. Lycomings instead of the two-bladed props and 260-hp. Lycomings which came on it.

Engine Kit for B50 Twin-Bonanza

DALLAS Aero Service last month began offering Homer Penwell's CAA-approved B50 Twin-Bonanza installation of Lycoming GO-480-B engines, derated from 275 hp. to 260 hp. for take-off at sea level, replacing the Lycoming GO-435-C2, which had a take-off rating of 260 hp. at sea level and a normal rating of 245 hp.

Penwell said the power advantage at altitude offers improved take-off at high elevation airfields such as Denver, higher rate of climb at altitude, 12-15-mph. increase in cruising speed at altitude and improved single-engine performance at altitude. In addition, the Dallas Aero Service installation also includes replacement of the B50's two-blade 98.5-in. propellers with 3-blade 90-in. Hartzell propellers; installation of an electric cross-over unfeathering system and installation of a modified breather system, which eliminates the breather tubes exposed atop the nacelles and dumps the blow-by into the augmentor tubes. Penwell claims lighter weight, adding 70 lbs. to the useful load at 6,000-lb. gross; 60-mile or more increase in range on the same amount of fuel, and less noise and vibration.

In a test hop at Dallas with full tanks and three occupants, and with gross weight of about 5,600 lbs., the modified B50 is said to have climbed from take-off 1,800 fpm. at 3,000 rpm. and 25 ins. It indicated 175 mph. at 8,000 ft. at 2,700 rpm. and 21.5 ins. for a 202-mph. true air speed.

The complete modification, which takes two weeks of down-time, is priced at $15,000 with new engines in exchange and $12,500 with remanufactured engines in exchange.

HOWARD AERO SERVICE at San Antonio International Airport has made a big business out of its pioneering Super Ventura conversion. To date, 19 of the 300-mph.-plus executive transports have been sold, 10 have been delivered and 7 are on the line. They average $425,000 per copy including full airline equipment, bringing to $4,250,000 the total value of the 10 Supers which have already been delivered (one of these has logged more than 1,000 hours of flying).

"The success of the Super has made it possible for us to handle the largest volume of executive aircraft conversion in the world," comments Dee Howard, president. His firm is currently grossing $6,000,000 annually and employs 560 workers. It will mark its 10th anniversary next month. Howard began his phenomenal business in 1947 when he left Slick Airways, where he was in charge of airframe overhaul and modifications on Curtiss C-46's (they licensed the first C-46 after the war). He started out with a tool box and $300 cash.

Officials of the firm in addition to Howard are Ed Swearingen, vice president and chief engineer; Landis Carr, vice president and general manager of manufacturing; and Tom Carmichael, vice president and general manager of service.

DICK RECKNER OF U. S. INDUSTRIES will soon be able to settle any arguments which may arise about X-Band versus C-Band radar. His two DC-3's have been equipped with radar by Remmert-Werner at St. Louis — one with X-Band and the other with C-Band. After a comparative evaluation of the two systems, both planes will be switched to the same type.

REMMERT-WERNER also reports

Important!

If you are considering the purchase of a new airplane, we invite you to visit the J. D. Reed Company, to

Compare... Beechcrafts for '57 —

The BEECHCRAFT Super 18
Flying 7 to 9 persons as far as 1,626 miles at speeds up to 234 miles-per-hour.

More POWER
More SPEED
More COMFORT
More BEAUTY
More SAFETY

An exciting world of *new flight* . . . as advanced, as thrilling, as revolutionary as the dawn of a new business age . . . is yours in the new 25th Anniversary Beechcrafts for '57.

Never before have such dramatic advances been incorporated into executive aircraft — and, as always, Beechcraft leads the way!

The BEECHCRAFT Twin-Bonanza
Flying 6 persons as far as 1,650 miles at speeds up to 240 miles-per-hour.

The BEECHCRAFT Bonanza
Flying 4 persons as far as 1,170 miles at speeds up to 206 miles-per-hour.

The J. D. Reed Company also takes special pride in the fact that our service and maintenance departments are geared to the same high Beechcraft standards. Our shops are staffed with factory trained specialists, equipped to handle any aircraft requirement and maintain a readily available supply of new factory parts. When you are ready to purchase a new airplane or need service on your present one — remember to call on the J. D. Reed Company, headquarters for Beechcraft sales, service and maintenance.

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a double engine and prop change for Dinny Heligenstein's Luhr Brothers' Twin-Bonanza; a new DC-3 for Dow Chemical has been delivered to Ted Merchant; relicensing for Hang Gausman's Fruin-Colnon Lodestar; fresh R-1830-94's for Fred Eide and Larry Lyons on Denison Engineering's DC-3; Super 92's for Ralph Primo and Ray Waldt on their Mississippi River Fuel Lodestar; and the works for Vern Poertner's Rahr Malting D18S — 1,000-hr. overhaul, double engine change and new interior. Poertner, says R-W, is brooding that there's just one thing wrong with the younger generation — he doesn't belong to it any more!

NEWARK AIR SERVICE, which handles all the maintenance and service on business planes at Newark Airport as well as the refueling of all commercial airliners there, has appointed David L. Steege as vice president and general manager. He was formerly senior representative in the air terminal properties division of the N. Y. Port Authority's aviation department and will direct Newark Air Service's expansion. The firm is a subsidiary of Lehigh Warehouse and Transportation Co., of which C. William Drake is executive vice president.

More business than ever is reported by L. V. Emery's **EXECUTIVE AIRCRAFT SERVICE** at Garland Airport in Dallas, which specializes in DC-3 and Lodestar work. In his shop

AN ILLUSION OF UNUSUAL CABIN LENGTH is achieved in this Aero Commander custom interior by Horton-Horton Interieurs International, Ft. Worth, for the Datics Corp., an electronic computer firm. Note card table with dictating machine, hatbox and oversized storage area behind rear seat. Headliner panels running fore and aft, with translucent overhead lighting panel, give appearance of more length. Translucent backdrop bears solid gold engraved plate of the company emblem, identifying the interior as the first in a new Gold Crest Series. Reading lights and vents are gold bronze. Draperies are of woven wood.

It's the "SUPER SKYHAMPER!"*

Another exclusive aircraft interior innovation by HORTON-HORTON. Originally developed for the famous Aero Commander, now being installed in Lodestars, DC-3's, Twin-Beeches and other executive aircraft.

- C.A.A. Licensed Seat.
- Upholstered top grain leather.
- Cushioned with Rubberfoam.
- Nylon safety belt.
- Seating fore or aft.
- Removable back rest.
- Insulated with Fiberglas.
- Removable ice box liner.
- Available as lavatory.
- Adjustable—moves on tracks.
- 2 minute installation if aircraft equipped with tracks.
- Can be shipped for local installation.

COSTS AS LITTLE AS $475.00

All seats are custom made to conform with aircraft interior fabrics and color scheme. Send for full particulars giving the make, model, interior fabrics and colors of your plane.

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Phone MArket 4-3021

Patent pending.

* Copyright applied for.

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See the Aero Commander Distributor in your area for information, a demonstration or factory approved service.

. . . **NOW TWO GREAT** AERO *Commanders*
560-A · 680-SUPER

late in January were: N. L. Ledbetter's Seaboard Oil DC-3 for complete conversion including Maximizer Kit, Dash 92 engines and full equipment; the U. S. Rubber DC-3 from New York (Paul McCahill) for interior trim, wheel doors, Dash 94 engines, paint job, Bendix radar and relicensing to 26,900-lb. gross; Bob Dodson's British-American Oil Lodestar for airframe inspection and new interior; Dow Chemical DC-3 from Midland, Michigan (Russell Purchase) for annual inspection; and Gulf Interstate Gas Lodestar from Houston, flown by Beryl Minard, for inspection, interior modification, Bendix radar and radio. Just finished and delivered were these jobs: Annual inspections for DC-3's of Sears from Atlanta (Bill Dameron), Tennessee Eastman from Kingsport, Tenn. (Leo Boyd), Sid Richardson from Ft. Worth (Ed Armstrong), Holley Carburetor from Detroit (O. E. Sparks) and Tecon of Dallas (Monty Montgomery), plus a Ft. Worth Lodestar of the S. B. Burnett Estate (Charlie Baudeux) which received a landing gear overhaul and annual inspection.

The Delhi-Taylor Oil DC-3 (Don Beeler), "Flying Ginny," was completed recently by Emery and is the topic of hangar conversation in many places where it has visited — it is the first DC-3 modified to carry all of its radio and equipment outside of the fuselage and in the old center section tank bays. These four bays, which formerly housed 820 gals. of fuel, now have separate access doors for the equipment they contain, while all fuel has been moved outboard — 1,150 gals. in the wet wing. Don Beeler is getting about 210 mph. on about 105 gals. per hour in the new "Flying Ginny" and has more cabin space than any DC-3 now flying, what with all his gear out in the center section.

EXECUTIVE FLYING FOR ROYALTY is performed the world over and this scene shows England's Princess Margaret leaving a de Havilland Heron of the Queen's Flight during recent journeys in Africa.

There's practically no limit to the size of a job **AERO CORP. OF ATLANTA** can do in its big shops at Atlanta Municipal Airport. Its recent work includes complete remanufacturing and rewiring of a C-54 for the Argentine Navy, also installing in it a Bendix X-Band radar, Sperry autopilot and Sperry engine analyzer.

Aero Corp. of Atlanta also reports a Bendix X-Band radar installation in a Tennessee Gas DC-3; installation of stair doors in 5 DC-3's for a new airline, Southeast Airlines of Kingston, Tennessee (Edward King is president and John C. Roberts is operations vice president of Southeast, which will carry passengers and cargo on an intra-state basis); remanufacturing of 12 Vought Corsair fighters complete with armament for the Argentine Navy, and numerous X-ray inspections for executive transports. "We specialize in X-ray inspections but also offer every type of aircraft inspection from X-ray down to magnifying glasses," commented Tom Lombardo and Ray Beck, referring to new Zyglo and Magniglo installations making their set-up complete. All Aero Corp. of Atlanta shops were recently modernized.

READING AVIATION SERVICE at Reading, Pa., has regained full-scale operations after settlement of

NEW! TRANSISTOR POWER SUPPLY—Does away entirely with mechanical moving parts. Two lifetime Transistors provide power.

NEW! TRANSISTOR LIGHT SWITCHING—All 3 Marker lights controlled electronically without relays. Fast response time and continuously variable sensitivity assures greatest reliability under all flight conditions. Can be used as 1-light receiver.

NEW! PEAK SENSITIVITY—A highly sensitive, highly selective crystal controlled circuit designed to reject spurious responses.

NEW! COMPACT MODULE DESIGN—Entire unit fits on short ¼ ATR Rack, weighs only 4½ pounds with power supply. Every major circuit division is a plug-in module for faster installation and service. The DARE Model DMB-3 Marker Beacon Receiver is designed to meet CAA-TSO requirements.

See The New Dare Marker Beacon Receiver at Leading Aircraft Distributors or write

DARE, INC.
TROY, OHIO

GOOD MAINTENANCE IS PREVENTION . . . NOT REPAIR

CERTIFIED BEECHCRAFT SERVICE offers many extras to the aircraft owner — extras that do not appear on the service or maintenance bill. But these little extras mean a big saving through the year.

A good example of one of these extras is the CLOSE INSPECTION your airplane receives while it is being serviced on the ramp of a CERTIFIED BEECHCRAFT SERVICE STATION. Trained service personnel will spot — and call to your attention — any mechanism that is not functioning properly thereby eliminating costly repairs later.

CERTIFIED BEECHCRAFT SERVICE technicians, with their long Beechcraft experience and factory training, know your Beechcraft from front to rear. But most important, they take a personal interest — and pride — in seeing to it that your Beechcraft serves you well.

So when your Beechcraft requires service — bring it to one of the CERTIFIED BEECHCRAFT SERVICE STATIONS listed — where it's always *"in good hands."*

AIRCRAFTCO, INC.
New Municipal Airport
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Will Rogers Field
Oklahoma City, Oklahoma

ALAMO AVIATION, INC.
Municipal Airport
San Antonio, Texas

ANDERSON AIR ACTIVITIES
General Mitchell Field, Milwaukee, Wisc.

ATLANTIC AVIATION CORP.
Teterboro Airport
(25 minutes from Times Square)
Teterboro, New Jersey
Logan Airport, East Boston, Mass.

ATLANTIC AVIATION SERVICE, INC.
New Castle County Airport, Wilmington, Delaware
Philadelphia International Airport, Philadelphia, Pa.

BUTLER CO., AVIATION DIVISION
Municipal Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport, Shreveport, La.

CUTTER-CARR FLYING SERVICE, INC.
West Mesa Airport, Albuquerque, New Mexico

GRAY AIRCRAFT SVC. CO., INC.
D. A. Cody, Service Manager
Love Field, Dallas, Texas

ELLIOTT FLYING SERVICE
Municipal Airport, Davenport, Iowa

LOPEZ GRACE AVIATION, INC.
Building No. 3 and No. 18
Broward International Airport
Fort Lauderdale, Florida

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind.

J. D. REED CO., INC.
Municipal Airport, Houston, Texas

TEXAS AVIATION CORPORATION
G. K. Roberts, Pounds Field
Tyler, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka, Kansas

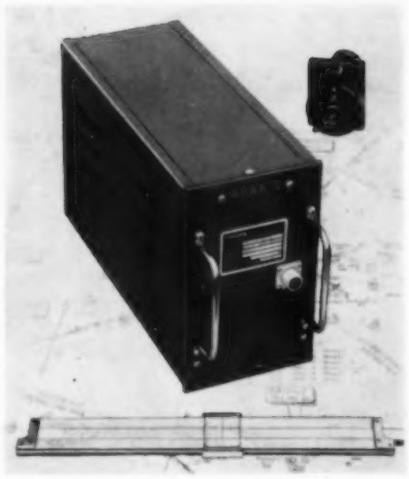
TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
Hangar 8, Municipal Airport, Tulsa, Oklahoma

We work so closely with Beechcraft owners in the maintenance of their airplanes, they have come to regard our service facilities as part of their own operation.

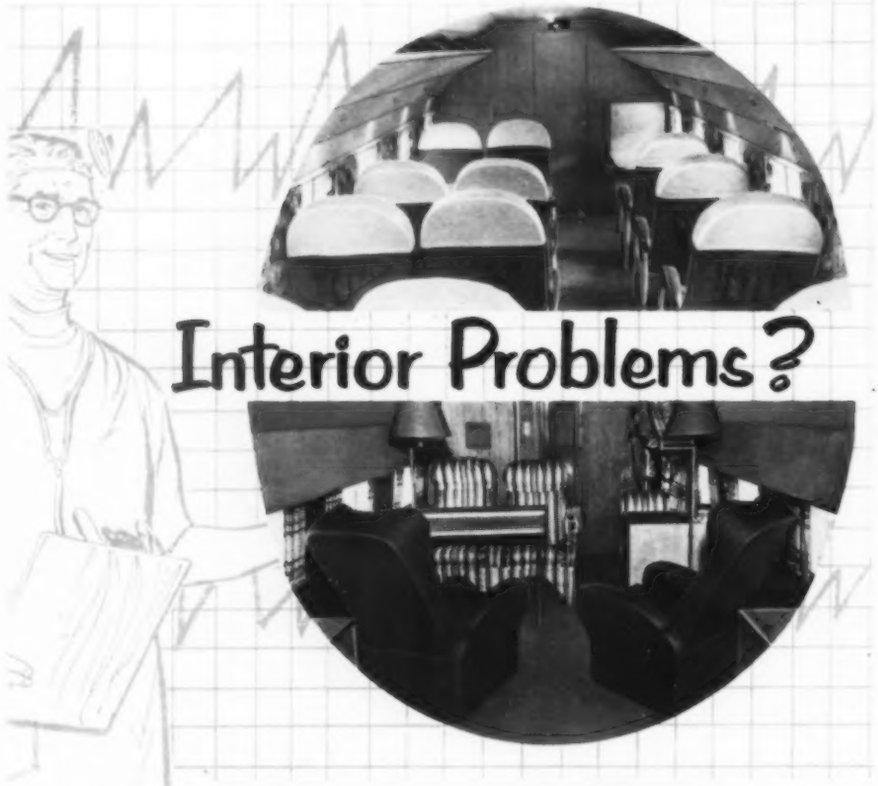
its recent strike. First jobs to get attention included a couple of Aero Commanders. One is Lukens Steel's 680, which is getting a Dare 90-channel communications system, a Collins navigation system, Collins glideslope, two type 21 ARC ADF's, an ARC 15D omni, a Wilcox 702 marker, a Flitetronics DSA5A isoamplifier, a Sperry C2A gyro system and H6B horizon, a new instrument panel and radio control panel with SAE grouping and lighting. A 680 Commander of Terminal Leasehold-Stewart Equipment is being repainted and will get a Lear L-2 autopilot with altitude controller, two Collins 17L4 VHF transmitters, a Bendix RA-18C receiver, two Collins S1R3 navigation systems, a Collins 51V2 glidepath receiver and 51Z1 marker, ARC Type 21 ADF, F-13A audio amplifier and CD-1 course director. It will have a custom panel with Grimes lighting, dual flight group and Jeppesen flight desk.

Other RAS jobs include Reed Zimmerman's New Holland Machine D18S, which is getting a Collins communications system including a 17L4 transmitter and 51X1A receiver and a lightweight Wilcox ADF; a new 985 engine for the Coal Sales Corp. Lockheed 12 flown by Jesse Norris; a new engine in Bob Smith's La Resista



New Aircraft Radio Line

Transval Engineering Corp., Culver City, Calif., headed by George K. Otis, has entered the aircraft communications and navigation equipment market with its first unit a 6-channel medium high frequency transmitter-receiver (above) of 35-watt output and only one-third the size and weight of any similarly-rated equipment. Henry J. Hamm (below), formerly with Lear, is aircraft radio division sales manager of Transval. Transistorized circuitry and power supply make possible the Transval Mark IV transmitter-receiver's small 1/2 ATR size and weight of less than 12 lbs. A single cable connects the unit to a small remote control head on the panel. Designed to fill the business flying need for 500-2,500-mile MHF operations, the Mark IV covers a range of 2 to 10 mc with 6 crystal-controlled channels, each for transmitting and receiving. Transmitter output is 35 watts into quarter-wave antenna and receiver audio output is 10 watts. Receiver sensitivity is 6 db. S to N at 5 microvolts and power consumption is 1.5 amps for receiver and 7 amps for transmitter at 13.75 volts.



consult specialists at Aero of Atlanta...

Whether you need an office, lounge or basic air line seating arrangement, the skilled employees of Aero of Atlanta will tailor the interior of your aircraft to meet your requirements for service, comfort and practicability. Whatever your interior problem, you can depend on the complete custom conversion to your specifications available at Aero Corporation. Shops and personnel are at your command to make your flying hours pleasant and profitable.

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Engineering	Overhaul	X-ray	Interiors
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Factory-Approved Collins—ARC

For further information call or write

AERO CORPORATION

ATLANTA AIRPORT / POplar 1-7721 / ATLANTA, GEORGIA

STANDBY ROCKET THRUST is being installed by many corporate airplanes. Here's a converted North American B-25 on which AiResearch Aviation Service at Los Angeles installed three 1,000-lb.-thrust Aerojet rocket engines, which weigh 140 lbs. each and can be fired in sequence or all at once. Internal mounting avoided drag, exhaust extensions were flush mounted to vent through a special fuselage cover plate, and the rockets were mounted at an angle of 16.5 degrees to the thrust line.

Corset Navion; an ARC Type 21 ADF for Dick Benson's Amphibious Charter's Widgeon (in which Secretary of State John Foster Dulles journeys to Canada on short vacations), and a Jonas Aircraft and Arms Piper Apache, which is getting Narco VHF and Sun-Air HF equipment.

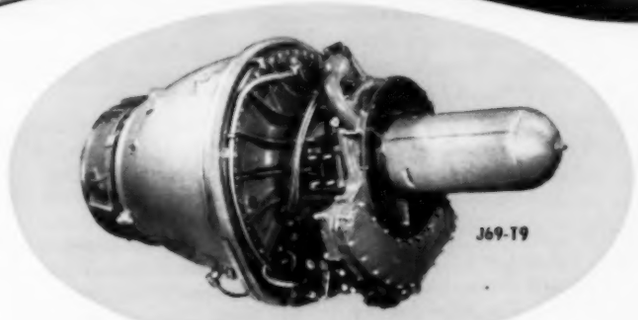
Four DC-3's have been purchased from United Air Lines by the **BABB COMPANY**, which sold one of them to Bonanza Airlines and will sell the other three abroad through Babb's foreign sales organization, says David A. Thomas, president.

AIRWORK CORPORATION reports over $3,000,000 worth of sales in aircraft engine parts, airplane tires and allied supplies through its base at Millville, New Jersey, and branches at Newark, N. J.; Alexandria, Virginia; Atlanta, Cleveland and Miami. Francis L. Hine, Airwork president, is distributor-vice president of the Aviation Distributors and Manufacturers Association and recently won for the second year the ADMA President's Trophy for having the highest number of distributor or manufacturer members in attendance at the annual meeting.

AERODEX AT MIAMI has received a $1,102,434 Air Force contract for R-2800 engine overhaul, according to R. M. Tonks, president.

More than 4,100 aircraft engines were overhauled during 1956 by **DALLAS AIRMOTIVE**, says Henry McGee, president. Called the world's largest aircraft engine overhaul company, Dallas Airmotive began with 190 engine overhauls in 1949 and completed 255 in 1950, 475 in 1951.

TEMCO TT-1



LATEST DEFENSE ASSIGNMENT for CAE TURBINE POWER

Performance and ease of control join hands with a high degree of safety in Temco's TT-1 primary jet trainer, which the Navy has ordered into production after exhaustive tests. This modern tandem two-seater is designed to condition the student's reflexes to the piloting of jets, from the very start. It is a matter of pride and gratification to CAE that this newest addition to our country's military training equipment flies with Continental J69-T-9 gas turbine power.

CONTINENTAL AVIATION & ENGINEERING CORPORATION
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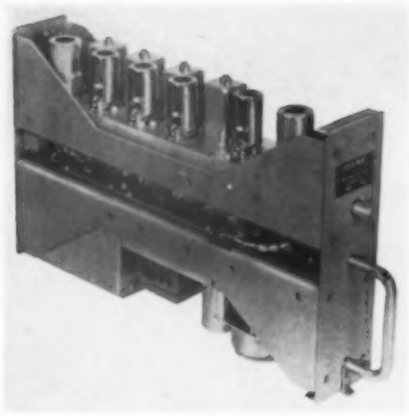


TRANSISTOR POWER SUPPLY for the new Dare DGS-30 glide slope receiver (above) eliminates the usual dynamotor or vibrator, using instead two Dare transistors operating as a multivibrator circuit to produce alternating current from the aircraft battery. The new receiver weighs only 6.75 lbs., fits a short ¼ ATR rack; has up to 20 crystal channels, in the 329.3-335.0-mc range, selected by a Ledex rotary solenoid; uses modular design for servicing; has ruggedized tubes and provides a sensitive, highly selective circuit for use with as many as 3 indicators at one time. Dare also has a new transistorized marker beacon receiver weighing only 4.5 lbs.

1,108 in 1952, 1,893 in 1953, 1,770 in 1954, 2,200 in 1955. It customers are business, executive and private plane operators, airlines, Air Force, CAA, Coast Guard and friendly foreign governments.

VAN DUSEN AIRCRAFT SUPPLIES has acquired Eastern Airmotive of Richmond, Virginia, and its operation at Byrd Field is now operating the Southern Division of Van Dusen Aircraft Supplies, according to George R. Galipeau, Van Dusen general manager, with George Tucker as Southern Division manager. Davis Mellor and H. Roy Sullivan remain with the division. Van Dusen operates at Teterboro, Minneapolis, Chicago, Boston and Alexandria, Virginia (Washington, D. C.).

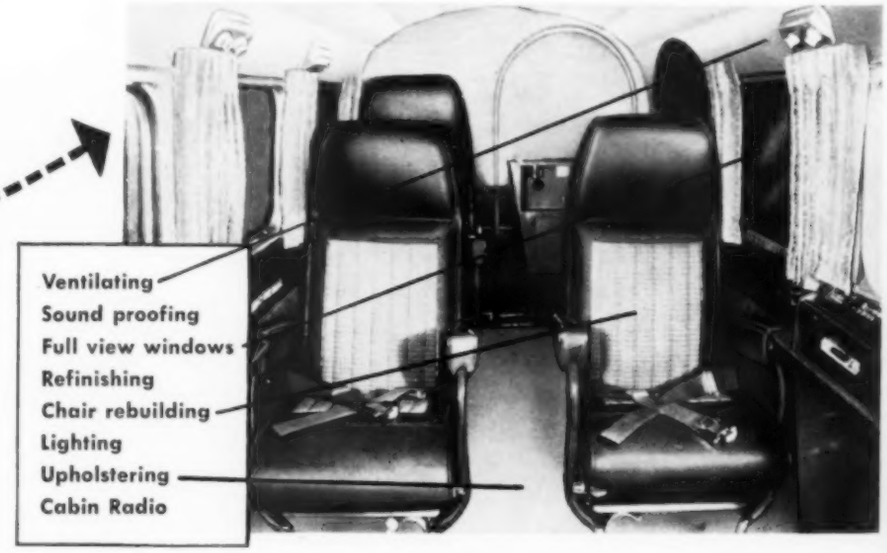
THIS MONTH'S VOICE OF EXPERIENCE: by Capt. F. E. W. Smith, TCA, Vancouver; from CALPA, Oct. 1956, "The Airline Pilot," and the Flight Safety Foundation's Pilot Safety Exchange Bulletin 57-100; condensed.

There are two ways of seeking safety from the new, or as yet unmastered, hazard. First is avoidance. If you feel unequal to the risks of tree climbing — don't climb trees. Avoid flying maneuvers which might cause destruction of the machine, unless properly equipped and prepared to meet the emergency and armed with a plausible excuse to top off the parachute ride home. If your aircraft is a single-engine VFR job and you are not competent to fly on instruments — don't take an IFR jaunt anywhere, any time.

The second way is to expand the limit of what can be done safely by education and equipment. This involves learning all there is to know about the hazards which can normally be expected, and about as many unusual ones as you can. It involves conditioning (the attainment of a mental attitude) and of physical skill, which will enable a man to do what he knows should be done when required. And it demands possession of proper tools for the job. The pilot needs a good aircraft, proper instruments and sufficient radio equipment before he can make a regular feat of flying to schedule.

Avoidance is a very basic right, for no human can be expected to take physical risks which are beyond his capability. No one is ever compelled to climb trees or to fly airplanes. However, to those who have chosen these occupations, avoidance is a luxury they can ill afford. If, for example, a pilot has decided that it is unsafe to fly on instruments because, perhaps, of the dangers of ice and turbulence lurk in cloud, he will seek to avoid all cloud flying. This is fine — except that some day he will not be able to avoid the cloud and, because he has limited his skill and knowledge, he

MODERNIZATION by Experts



There's every service you need at Ohio Aviation

The one-stop convenience of modernization service at Ohio Aviation is being used by a rapidly growing list of private and business aircraft owners of Beechcrafts and Lodestars. The comfort and relaxation of an Ohio Aviation engineering job brings living room relaxation to passengers. These and many other services are handled on a production line basis that keeps non flying time to a minimum.

1. VENTILATING. Fresh conditioned air furnished by Ohio Aviation's installation greatly increases passenger comfort.

2. SOUND PROOFING. Complete Fiberglas insulation on cabin surfaces drastically reduces sound level.

3. FULL VIEW WINDOWS. Jumbo double pane windows open the view—lower sound level.

4. REFINISHING. Interior metal surfaces finished in smooth durable lacquer to compliment cabin decor.

5. CHAIR REBUILDING. Deep, soft, foam rubber chairs, upholstered in your choice of leather or wool and dacron fabrics.

6. LIGHTING. Soft, diffused adequate lighting spreads through the cabin from these streamlined lighting fixtures.

7. UPHOLSTERING. In your selection of many wool or dacron fabrics. Installation of carpet and expert custom tailoring of chairs and wall areas.

8. CABIN RADIO. For standard broadcasts. The final touch for "living room" relaxation.

And many others. Ohio Aviation can give you any combination of modernization services desired. For information on scheduling call Charles Groff at MO 4-4646.

THE OHIO AVIATION CO.
Dayton Municipal Airport,
Vandalia, Ohio

CONTINUOUS FREQUENCY COVERAGE features Lear's new ADF-12E ADF, which has provisions for furnishing modulation and power for the Lear RT-10E VHF transmitter. It can be continuously tuned through 190-440, 420-900 and 850-1750-kc bands and its tuner (above) features a new full-reading illuminated dial. New feature is an ADF test circuit for checking operation at any time and a beat frequency oscillator is available as an accessory. The complete ADF-12E system weighs less than 18 lbs. and is for 12 or 24-volt systems.

will be in great danger in a situation which another pilot would term routine.

The safety of avoidance is largely illusionary. The only safety is in care, which is a must, and competence, which is skill developed through study, practice and experience. The attainment of this competence is a continuing, continual process for no one can ever say he is master of all emergencies. Any pilot who stops his progress to an ultimate mastery of the air, who says to himself that he knows all he wants to, or needs to, know of flying, is deluding himself and is placing himself in a position where he must seek safety in avoidance. Once he has so decided, his operation ceases to to be safe.

Anticipation of emergencies, devising means of surmounting them, improving on existing techniques, all are highly profitable ways for a pilot to spend his time. For one thing, such activity makes him safety-minded, not chance-minded. For another, by continually expanding what he can do, it makes him progressively safer in the air, putting real value into his experience. No wild fancy is too improbable for consideration.

NEW HALF-PANEL DILUTER DEMAND OXYGEN REGULATOR by Scott Aviation Corp. is being ordered by airframe manufacturers for jet transport crews requiring air-oxygen mixtures below 30,000 ft. and 100% oxygen at higher levels. The "Normal-100%" switch prevents cockpit air from entering the regulator in emergencies involving toxic fumes or gases. The "Emergency-Off" switch provides safety pressure to prevent inward mask leakage.

AIRESEARCH AVIATION SERVICE at Los Angeles International Airport has added Ralph Matthews, Jr., to its sales staff and Don Neumayer, sales manager, says Matthews will travel throughout the Eastern U. S. as sales rep. He was formerly chief pilot for Sawhill Tubular Products with which he accumulated 884,000 accident-free executive flying miles to win an NBAA safety citation.

DALLAS AERO SALES totaled $2,000,000 for 1956, an increase of more than 42 per cent over the firm's 1955 gross of $1,400,000. In 1954, DAS sales amounted to $800,000. Eugene W. Bailey, vice president and general manager, said the 31-year-old company now employs 215 persons.

BOOK FOR AIRMEN: "Dianetics, the Modern Science of Mental Health,"

now available — on display

Deluxe Super 92 DC-3

Immediate delivery, with new ship guarantee on airframe, and 800-hour guarantee on engines. Completely disassembled and rebuilt. Luxurious lounge interior, with all large cabin and picture windows. Flush loops, retractable tail wheel, lightweight landing gear doors, Collins and Bendix executive radio, many extras. Today's fastest and quietest DC-3.

Super 92 DC-3

Nearing completion as deluxe Super 92 DC-3 to our own specifications, but still early enough in work to incorporate some of your own custom requirements. Will have all large windows, complete disassembly and overhaul, new ship guarantee, 800-hour engine guarantee.

Low Time C47s

A new one each month. They are now in various stages of disassembly, overhaul, and conversion at our four conversion centers in St. Louis, Toledo, McBride, and Pompano, and can be completed with many of your own modifications, with choice of engines, radio and electronic equipment, and airframe refinements.

Grumman Goose

Immediate delivery. Freshly overhauled airframe, props, and engines (with crankshaft modification), new interior, new exterior paint. Light weight, late model. Omni, VHF, ADF, etc.

Grumman Gooses

Now in early stages of overhaul, ready for your own specifications.

Custom 18

Immediate delivery. New ship guarantee on freshly overhauled airframe, 800-hour guarantee on NTSO engines. Painted exterior, de-icers, radome nose, Grimes beacon, all large cabin windows, Custom 18 enlarged interior, with modified front bulkhead, lavatory, snack bar, special seats. Dual instrumentation, electric and vacuum, L2 autopilot, Grimes lights, Sperry H5 horizon and C2 gyrosyn compass, dual 149H inverters. Collins 51R omni with 51V glide slope, A.R.C. omni, 50 channel VHF transceiver, standby A.R.C. T20 VHF transmitter, Bendix ADF, 3 light marker, isolation amplifier, dual speakers, many extras.

Remmert-Werner of Florida

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Phone Fort Lauderdale — JAckson 3-2950
or Pompano Beach — 3-2492 or 9175

"The People, Yes..."

CENTRAL AIRLINES **Centraliners** now serve 34 cities and 51 military installations in a six-state area. Colorado is the latest member of the steadily-expanding **Centraliner** network.

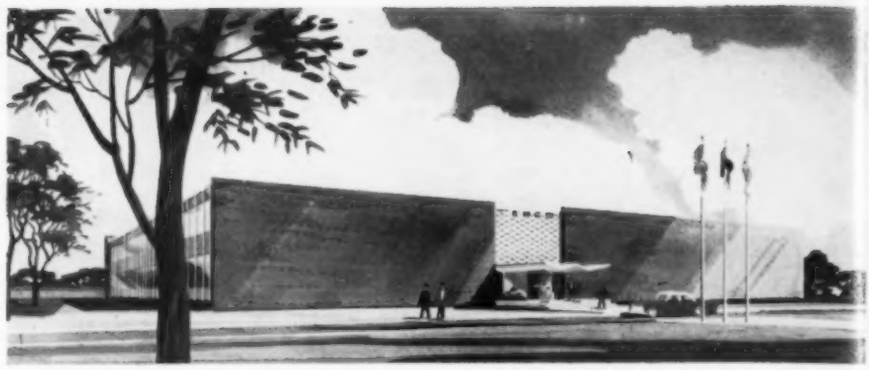
Expansion of CENTRAL's facilities is in line with the company's keystone principle to grow in ratio to people's need of scheduled local air service.

Today, because of The People, in many cities in Arkansas, Colorado, Kansas, Missouri, Oklahoma and Texas, CENTRAL AIRLINES offers speedy commuter flights . . . flights to distant cities only a few air-hours away . . . excellent connections with scheduled coast-to-coast airlines to any place in the world.

One of America's 33 federally-certificated, scheduled airlines established 14-million miles ago.

CENTRAL AIRLINES, INC.

GENERAL OFFICES
Meacham Field • Fort Worth, Texas



NEW CORPORATE HEADQUARTERS FOR TEMCO AIRCRAFT is a 100,000-sq. ft. office building going up at Temco's Garland plant near Dallas, into which the firm will move from its present location at Grand Prairie in the former North American plant now a Navy facility needed to meet expanding Chance Vought Aircraft needs. Temco engineering staffs are also moving into several Dallas, Arlington and Amon Carter Airport offices.

by L. Ron Hubbard, $4, Box 242-AD, Silver Springs, Md. Pilots desiring to know more about what makes man tick will want to read this analysis of the mind, written by an American engineer and nuclear physicist on the principle that there are thousands of times the power in one human brain than all the atoms of the universe contain. "It is written," says the author, "for the man who owns a body and a mind and wants to keep them in working order." The book is on the order of a workman's manual for an engine or vehicle — "the body and mind function in this manner," says Hubbard, "and to keep that functioning from being blocked off, you do this and this. . . . The blocks lie here. You reach them in this way, take a look at them and discard them." He says the power locked in the human mind is infinite and discusses ways and means of developing it.

READING AVIATION SERVICE is enlarging its exhibit area and lowering its rates for displays for the

outperform them all with a McCauley Met-L-Matic Propeller

Shorter Take-off

More Rapid Climb

Faster, Smoother Cruise

The McCauley Constant Speed Met-L-Matic translates engine power into better flying performance. You owe it to yourself to specify the best propeller —McCauley.

Met-L-Matic is shown on Cessna 182.

AIRLINER MET-L-MATIC FORGED STRENGTH McCAULEY

McCAULEY INDUSTRIAL CORPORATION
1940 HOWELL AVE.
DAYTON 7, OHIO

"World's largest manufacturer of metal propellers for personal and business aircraft."

SUPER 6 MODERNIZED CONVERSION OF THE T-6 TRAINER is being offered in kit form to foreign air forces and others by Erle L. Bacon Corp., Santa Monica, Calif. It features tricycle gear, Gordon Israel power package with jet stacks and augmentors, one-piece canopy, new wheels with spot single-disc brakes, wings shortened 4 feet, tip tanks and general cleanup. Relocation of main wheels eliminates center-section tanks but tip tanks and 30-mph. increase in speed offer 20 per cent range increase. Picture shows Super 6 before its new cowling was installed.

8th Annual Maintenance and Operations Meeting on June 1 at Reading (Pa.) Municipal Airport. Sime Bertolet, president, expects a record number of exhibitors, aircraft owners, pilots and business executives. A new and larger building will be used. Last year, several dozen manufacturers displayed their products, including aircraft, parts, electronic gear and instruments. Space rates for displays range from $250 for a 10-ft.-sq. area to $675 for a 10 by 30-ft. area, complete with back drops and railing.

RALPH LEHMAN, formerly with Slick Airways and assistant commercial sales manager for LearCal Division of Lear, Inc., has been named manager of aircraft equipment sales for Federal Telephone and Radio Co., to supervise national sales of its tubeless autopilot and Vortac navigation equipment.

PROVEN beyond QUESTION

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AMPHIBIOUS FLOATS

Nearly one hundred sets of Edo Amphibious Floats are in daily use around the world, piling up proof of their stamina, providing their owners with untold utility.

On rough gravel strips north of the Arctic Circle, in scheduled airline operations in the Northwest, speeding oil drilling operations in Louisiana and South America...aircraft with Edo Amphibious Floats are proving beyond question the advantages of such flexibility of operation and the ruggedness of Edo's thoroughly proven amphibious gear.

Edo Amphibious Floats are approved for the Cessna 180, the deHavilland Beaver and Otter with only a slight sacrifice in payload and performance—far outweighed by increased utility. Other approvals are pending.

Why not investigate how the ability to land at will on airport or water will increase the utility or revenue possibilities of your flight operations? Send for Edo Float brochure.

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Fine Floats Since 1925

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The breath-taking beauty of the interior of conversion number 107 presents the finest in luxurious, yet efficient, executive aircraft. From the cockpit forward, completely equipped with the latest in radio and navigational radar, all the way back through the comfortable, beautiful cabin . . . past the sleeper couches, the luxury lounge seats, the fully-equipped galley amidships, all the way to the rear . . . this DC-3 for an old satisfied customer is a fine example of what skill, experience and high-quality workmanship can do. Satisfied customers are our best recommendation.

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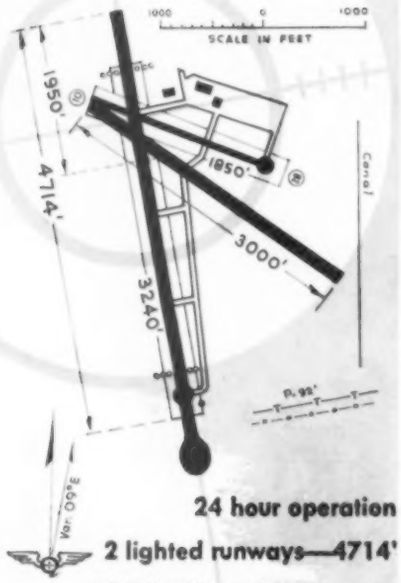
Target for Texans



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80-90-100 octane gasoline

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269 kc AAP

Expanded Cafeteria facilities

15 miles Due West of Houston

Transportation to Houston and Shamrock Hotel

AVIS RENT CARS ON FIELD

Bob owner-manager

Andrau AIR PARK

Houston

POWER CURVES

(Continued from page 33)

a detonation induced from single ignition operation. Number 8 cylinder the bottom jug on an 1830-92, was the culprit. This being the lowest, it was the one to suffer most from moisture in the ignition harness. Number 9, right beside it, wasn't in too bad a shape. This brings up a hypothetical question: If you have bad ignition and must fly to a near-by field for help, what do you do? We suggest operation at the lowest possible power until the trouble is corrected. Better yet, don't fly at all until it is corrected.

What constitutes too high an rpm — or too high a manifold pressure? How do you choose your limits? The only answer is to know your engine. In this connection, one suggestion might be in order: Next chance you get, read CAR, Part 13, Section 13.154, and see what your engine goes through endurance-wise to get an ATC.

MOONEY MARK 20

(Continued from page 26)

lons an hour at the same altitude; so we chalked it up to a variation in carburetors.

Frankly, I couldn't see reason for anything but elation over the $15.98 gas bill for the 44.4 gallons, which figures 27.4 miles to the gallon! That

STRETCHED WING for the Grumman SA-16B Albatross rescue amphibian, plus larger horizontal and vertical tail surfaces, has provided increased speed, range and single-engine performance (note feathered prop). The wing was lengthened 16.5 ft. The modifications cost 1,600 lbs. in weight. Wing slots have been replaced with cambered leading edges for better control at low speeds and high angles of attack.

—(Grumman Photo.)

CESSNA 180

Hartzell.

COVERS THE FIELD

why Hartzell constant speed and feathering propellers are specified as standard equipment on nearly all aircraft in the 150 to 400 HP category

- Highest possible overall performance
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Trecker
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and others

Why Pay More?

Hartzell. **PROPELLER, INC.** HARTZELL

PIQUA, OHIO, U.S.A.

AVIATION DISTRIBUTORS AND MANUFACTURERS ASSOCIATION recently elected J. Turner Moore, Jr. (left), vice president of the Electric Auto-Lite's battery division, as president, and honored W. T. Piper, Sr. (right), the airplane manufacturer, with ADMA's first award to an individual whose accomplishments have benefitted directly the distributor segment of the aviation industry. Robert S. Northington, vice president of Piedmont Aviation, Winston-Salem, the ADMA's retiring president, is shown presenting the gavel to Moore and the coveted award to Piper.

night on TV we heard a Mobilgas advertisement boasting an automobile cross-country test record of 19.95 miles per gallon. The modern American lightplane has made obsolete the modern American automobile for personal travel over long distances. It is strange how few have discovered it.

Coming back the next day we, of course, had head winds. Low ceilings while crossing the mid-section of the Florida peninsula plus stronger winds at higher altitudes kept us below 3,000 feet for a large part of the return to Dallas. The low altitudes and the head winds increased our gasoline consumption and elapsed time, forcing one stop at Meridian, Mississippi, for gas. On this leg we burned 40 gallons in 5 hours, 5 minutes for an average of 7.8 gallons per hour as compared with 6.8 going down. From

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AND
COMPLETE
AVONICS
MEET

Lear

ARC

At Faulkner Air Radio safety is more than a byword, safety is the WATCHWORD! Safety in the sale—your assurance that you buy only what you need and want. Safety in engineering—only the most highly skilled technicians touch your equipment. Safety designed custom installations—designed to fit your specific equipment needs. Safety in maintenance—the entire technical staff at Faulkner Air Radio stands ready to maintain your equipment and keep you flying!

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New Modern Mid-western Maintenance Facility

For Lease

Available June 1, 1957

Large hangar and shop facility now under construction. Clear span of 280′ door opening with a depth of 125′. Lean-to machine shop contains showers, toilets and locker rooms for employees. Includes two-story air-conditioned office facility and customers lounge.

Hangar and facilities located at progressive Greater Rockford Airport, 80 miles northwest of Chicago, in Rockford, Illinois.

Expansion program now under contract lengthening instrument runway, installation of high intensity lights and new control tower. By late 1958 Greater Rockford Airport will have an ILS and 6,500′ instrument runway and complete weather bureau on field.

This new maintenance facility will be ammortized on a 25-year basis and rent will be set upon the basis of this ammortization.

Financially responsible individuals or corporations are invited to call at Manager's Office where they may see plans and discuss the matter more fully.

Greater Rockford Airport Authority

Greater Rockford Airport

Telephone Number 5-8639 **Rockford, Illinois**

AVIATION GAS PRICES REDUCED 4½¢ A GALLON IN PENNSYLVANIA!

The Commonwealth of Pennsylvania calls the attention of carriers and executive and private plane owners to the fact that the tax on aviation gasoline throughout Pennsylvania has been reduced from 6c to 1½c per gallon—a savings of 4½c on every gallon! It is our sincere hope that this reduction will bring you greater convenience and lowered costs of operation.

WILLIAM R. DAVLIN, *Secretary*
DEPARTMENT OF COMMERCE
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG, PENNSYLVANIA

Meridian to Dallas we pushed the throttle ahead to get some experience with maximum cruise at 2,400 rpm. and 24 ins. manifold pressure. This leg further increased our gas consumption to 31 gallons in 3 hours, 15 minutes or an average of 9.6 gallons an hour. Our gas cost for the 1,242 miles home was still only $27.95 for an average of 17.7 miles to the gallon. Air time returning was 8 hours, 20 minutes.

Toting up for the 2,462-mile round trip, here's the pay-off:

Round trip ground speed, mph.	168
Total fuel used, gals.	115.4
Average fuel consumption, gph.	7.75
Oil consumed	None
Fuel cost	$43.93
Miles per gallon	21.5

So we found out for ourselves that everything the new Mark 20 owners are saying about their craft is true and their enthusiasm is well founded. When you consider that the new Mooney has a 107 mile-an-hour differential between maximum cruise and stall it begins to soak in what Mooney has accomplished with aerodynamic cleanliness and especially the laminar-flow wing. From a maintenance standpoint, owners of the 150 Lycoming engine know how tried and true it is. The manually-controlled retractable landing gear and flaps also are feathers in Mooney's cap for they are main-

PNEUMATIC SAFETY CUSHION to reduce the chance of injury to passengers in transport accidents and forced landings is shown being demonstrated by Designer Assen Jordanoff, who says it wil be produced by Micro-Moisture Controls, Inc., Mineola, N. Y. The safety pillow is installed in the back of airplane seats and a transport pilot, by throwing a single switch, can inflate a planeful in three seconds.

Airmen's Calendar

Feb. 14-15—2nd Annual National Jet Age Conference, Sponsored by Air Force Association, Sheraton-Park Hotel, Washington, D. C.

Feb. 18-20—1st National Scientific Space Travel Symposium, Sponsored by Air Force and Convair, El Cortez Hotel, San Diego.

Feb. 24-26—6th Annual Texas Agricultural Aviation Conference and Short Course, A & M College, College Station, Texas.

Feb. 27-28—Transportation Management Research Symposium, Purdue University, Lafayette, Indiana, Directed by Prof. A. Charnes.

Feb. 27-Mar. 1—6th Annual Indiana-Ohio Agricultural Aviation Conference, Purdue University, Lafayette, Ind.

Mar. 5-7—Air Line Pilots Association Annual Air Safety Forums, Hotel Shoreland, Chicago.

Mar. 7-8—National Aviation Education Conference, Mayflower Hotel, Washington, D. C.

Mar. 12-14—Flying Physicians Association's Spring Cruise and Medical Meeting, Grand Bahama Islands with Tour to Havana.

May 8-11—13th Annual American Helicopter Society National Forum, Sheraton-Park Hotel, Washington, D. C., Harry Lounsbury, Executive Secretary.

June 1-9—First Annual National Aviation Trades Show and Exhibits, Monmouth County Airport, New Jersey.

NATIONAL AVIATION TRADES ASSOCIATION CONVENTION scenes in St. Louis recently included these two groups. At top, left to right, are Millard L. Bennett, Nebraska Aeronautics Commission safety director; Mrs. Charles Haeseker and her husband, who is a partner in Lincoln Aviation Institute at Lincoln, Nebraska, and John Clinch, the well-known North Platte, Nebraska, operator. In lower photo, left to right, are Gordy Newstrom of Grand Rapids, Minn., who acted as waiter at a Van Dusen reception; George Galipeau; G. B. Van Dusen, and Norm Larson of Van Nuys.

—(Photos by Sig Gudmundson.)

tenance free — no electric motors or hydraulics.

Next to the startling performance and economy of the flight the biggest surprise came from the comfort we experienced during the more than six hours duration on the way down. The older we get the less we want to sit long hours in one spot; we were prepared to get numb just sitting there with nothing to do but ride the omni, check the weather, winds, the fuel consumption and the ETA's. With two pilots taking turns, the sliding front seats provide welcome stretch room. In the stable, cold January air it was simply effortless flying the Mark 20. Besides, it flies best either feet off or hands off once you're trimmed out at economy cruise. Mooney's upholsterers are to be congratulated on the soft and comfortable seats and the engineers for the hush-quiet soundproofing, a large measure of which apparently comes from a newly designed door in the '57 model as well as a new exhaust system which eliminates the troublesome old augmentors.

We were prepared to go as high as the best winds and service ceiling demanded, equipped as we were with two Scott portable oxygen systems boasting a range equivalent to the

why so many Tri-pacer owners fly Globe G/S

High performance . . . economical . . . roomy . . . Piper's new Tri-Pacers make business flying easier than ever. And many Tri-Pacer owners are discovering even more freedom from mental pressure in traffic and low visibility by letting the Globe G/S take the rudder. The Globe pilots the plane while you check maps, tune radios, watch for traffic, or relax on long flights . . . with hands and feet off the controls! Move the Trim-Turn knob to automatically enter and hold a stable turn. SEND NOW FOR FREE LITERATURE.

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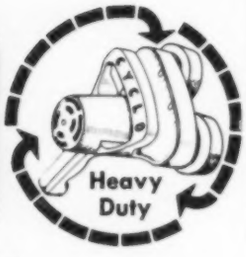
Lear Service Network

For factory-certified service in more locations around the country to meet the needs of business plane users, Lear is fast filling the gaps in a network of over 100 radio service stations certified by both the factory and CAA. At left top is one of the stations, Santa Monica Aviation in California, which has over $50,000 worth of test equipment and which is also distributor for Aero Commanders. Smaller photos show factory experts at the Lear service school demonstrating use of test equipment in checking out an L-2 autopilot (left) and an instructor lecturing students on servicing an omni receiver. Lear distributors send technicians to the school for 2-to-3-week courses, are then checked periodically by Lear's four regional factory service stations at Teterboro, Grand Rapids, Wichita and Santa Monica.

airplane's range The fact that we had the Scott equipment gave us that secure feeling of "money in the bank" and convinced us that every business airplane should carry it as necessary equipment.

Ours was the standard model except for the Narco 5-crystal Super Homer VHF Omni transmitter-

CYCLO
Aircraft Polisher



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6 Washable Bonnets	9.00
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Total Value	**$104.85**

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Send check or money order $97.50. We pay shipping cost. 10% Discount on two units. 20% on three or more. *Dealer and distributorships open.* If in Mexico order from Vest Aircraft de Mexico, S. A., Paseo de La Constitucion, No. 418-A, Mexico 9, D. F.

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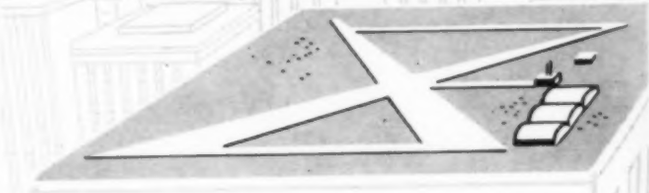
LANDING ON YOUR HOTEL



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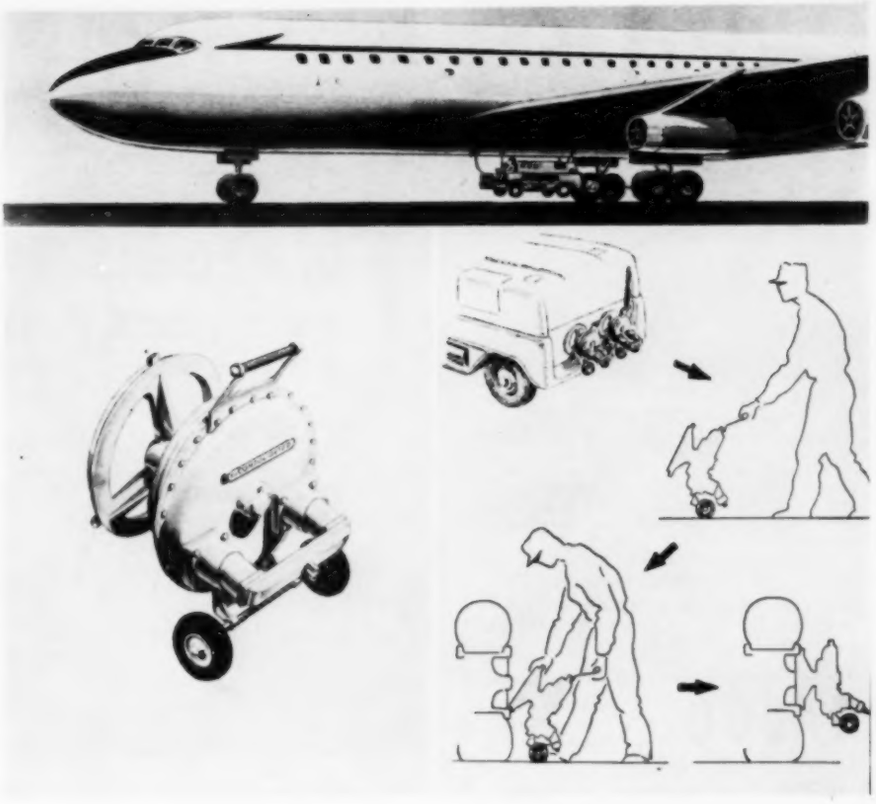
- Call Unicom 122.8

Aero Commander—Distributor For Oklahoma

Wheel Units for Jets

Soon jet airliner pilots can taxi on terminal ramps without using their jet engines, Consolidated Diesel Electric Corporation has a mobile power unit which meets an arriving jet, lifts itself to be suspended beneath the airliner's belly into which its controls are plugged, and enables the airliner pilot to do his own taxiing with the aid of hydraulically-powered individual wheel mover units which are attached to the main landing wheels as shown in the sketches. The mobile power unit not only supplies hydraulic power to the wheel units but furnishes compressed air and electrical service to the airliner while its main power plants are shut down. The airliner captain controls it and his aircraft parking without relying on ground tug or operator.



receiver. At 12,000 feet we could still read Dallas radio 115 miles out. Since radio communications are becoming more and more important in civil aircraft utilization, little wonder that the trend is to higher altitudes when weather and performance characteristics permit. The planners who are working on our aviation facilities problems might well take cognizance of civil aviation's traffic upstairs.

Hoffman told us they had been working so hard on perfecting the airplane and whipping production problems that they had postponed building up a hard-hitting distribution network but that now they were going out and close up the gaps in some mighty fine territories where distributorships are open.

List price on the Mark 20 is $13,750. It grosses out at 2,450 pounds as against 2,550 for the Cessna 182. Useful loads are within a few pounds of each other and the Mooney has 80 less horsepower. Hangar flying sessions hold that the competition to the Mooney is the used Bonanza and perhaps the forthcoming Piper Comanche. Out at Mooney they have great respect for the competition and as Hoffman puts it: "Those comparisons are real complimentary to us as far as equipment goes. What we need now is some effective distribution. We have the product." ★ ★ ★

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DeHavilland Dove. Mfg. August, 1952. T. T. 2200: T. T. Engines 630: New paint, controls recovered. L-2 auto pilot, custom panel, dual omni, ARC and Collins. De-icers, dual lights. Six place. Both airplanes in top condition. Will sell either one.
Cessna 180. Mfg. April, 1954. T. T. 960: T. T. Engine 425: LTRA6, Full panel w Vacuum System. Good condition. Phone or write

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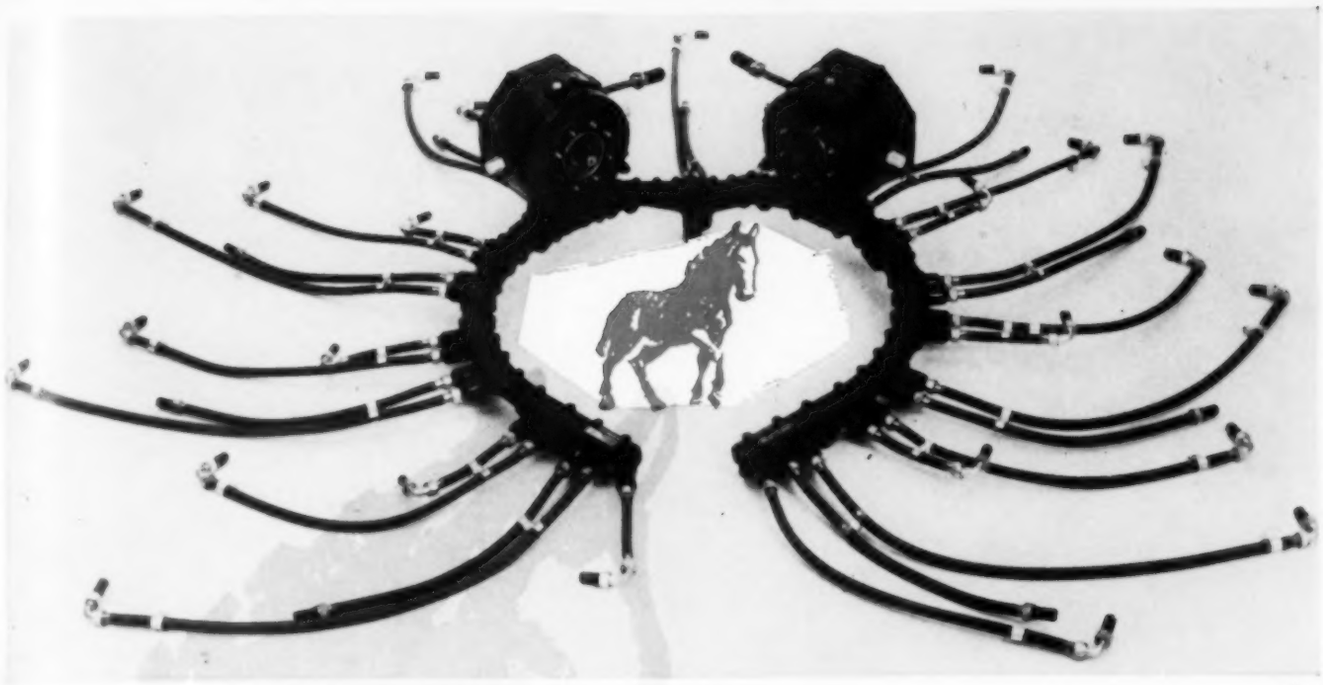

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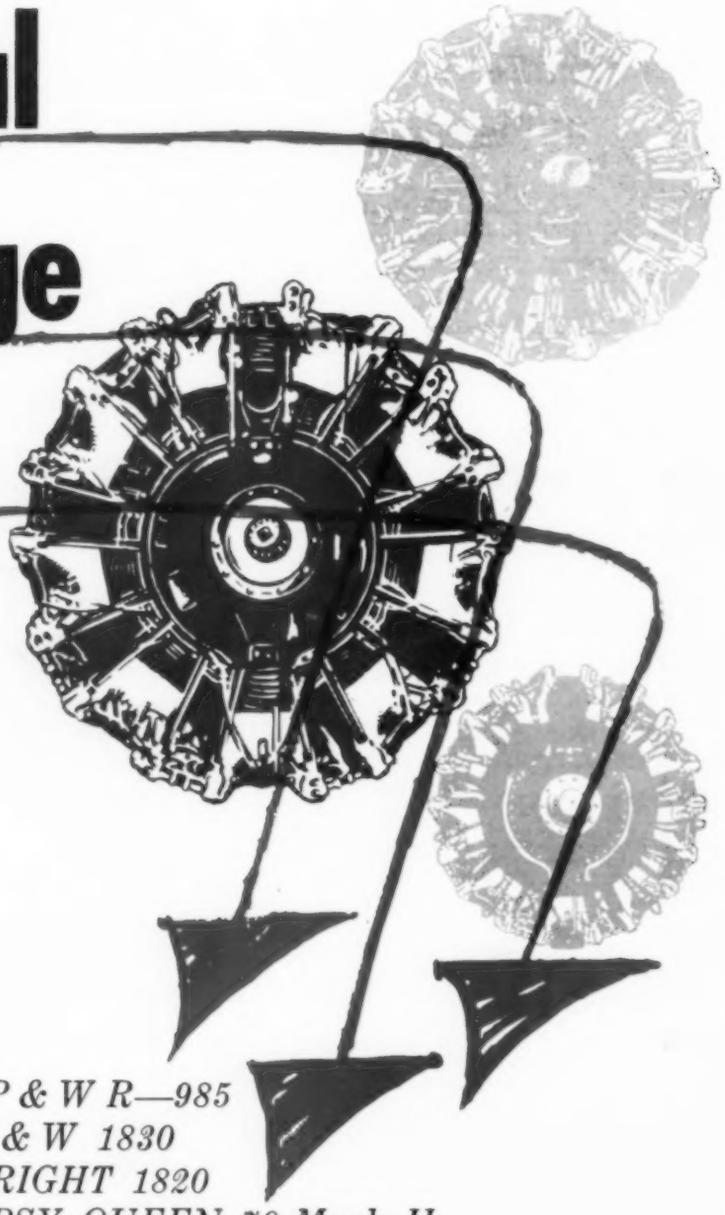

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